

STEAMFITTERS'
HANDBOOK
OF
DIRECT AND INDIRECT
RADIATORS



THE H. B. SMITH CO.

728 Arch Street, PHILADELPHIA

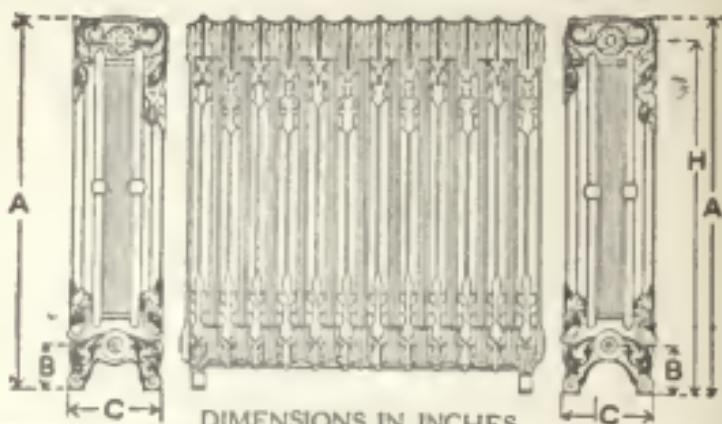
Works :
WESTFIELD, MASS.

Salesroom :
133 CENTRE STREET
NEW YORK, N. Y.



DIRECT
RADIATORS

IMPERIAL UNION—STEAM and WATER



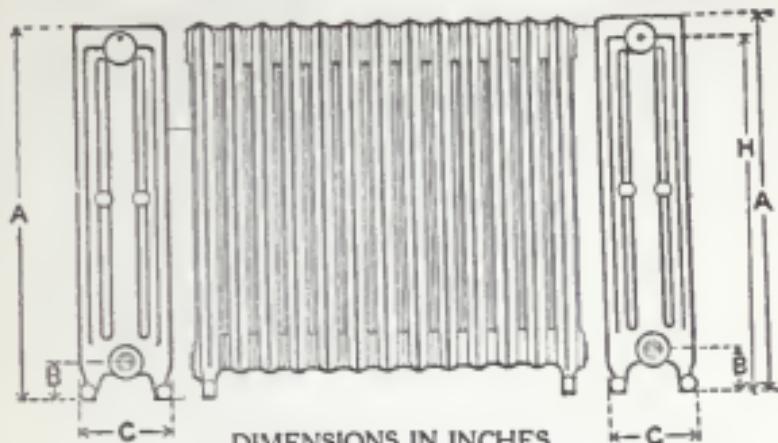
DIMENSIONS IN INCHES

A	Height of Radiator.....	45	37	31	25	19
H	Height of Top Tapping..	43	35 $\frac{1}{4}$	29 $\frac{1}{4}$	23	17 $\frac{1}{4}$
B	Height of Regular Tapping.....				4 $\frac{1}{2}$	inches
C	Width of Section.....				9	"

LIST OF SIZES

Number of Sections	Total Length Feet Inches	RADIATING SURFACE (Square Feet)				
		45 in. High	37 in. High	31 in. High	25 in. High	19 in. High
3	0 10 $\frac{1}{4}$	24	19 $\frac{1}{4}$	16 $\frac{1}{4}$	13 $\frac{1}{4}$	10 $\frac{1}{4}$
4	1 2	32	26	22	18	14
5	1 5 $\frac{1}{4}$	40	32 $\frac{1}{4}$	27 $\frac{1}{4}$	22 $\frac{1}{4}$	17 $\frac{1}{4}$
6	1 8 $\frac{1}{4}$	48	39	33	27	21
7	1 11 $\frac{1}{4}$	56	45 $\frac{1}{4}$	38 $\frac{1}{4}$	31 $\frac{1}{4}$	24 $\frac{1}{4}$
8	2 3	64	52	44	36	28
9	2 6 $\frac{1}{4}$	72	58 $\frac{1}{4}$	49 $\frac{1}{4}$	40 $\frac{1}{4}$	31 $\frac{1}{4}$
10	2 9 $\frac{1}{4}$	80	65	55	45	35
11	3 3 $\frac{1}{4}$	88	71 $\frac{1}{4}$	60 $\frac{1}{4}$	49 $\frac{1}{4}$	38 $\frac{1}{4}$
12	3 4	96	78	66	54	42
13	3 7 $\frac{1}{4}$	104	84 $\frac{1}{4}$	71 $\frac{1}{4}$	58 $\frac{1}{4}$	45 $\frac{1}{4}$
14	3 10 $\frac{1}{4}$	112	91	77	63	49
15	4 1 $\frac{1}{4}$	120	97 $\frac{1}{4}$	82 $\frac{1}{4}$	67 $\frac{1}{4}$	52 $\frac{1}{4}$
16	4 5	128	104	88	72	56
17	4 8 $\frac{1}{4}$	136	110 $\frac{1}{4}$	93 $\frac{1}{4}$	76 $\frac{1}{4}$	59 $\frac{1}{4}$
18	4 11 $\frac{1}{4}$	144	117	99	81	63
19	5 2 $\frac{1}{4}$	152	123 $\frac{1}{4}$	104 $\frac{1}{4}$	85 $\frac{1}{4}$	66 $\frac{1}{4}$
20	5 6	160	130	110	90	70
21	5 9 $\frac{1}{4}$	168	136 $\frac{1}{4}$	115 $\frac{1}{4}$	94 $\frac{1}{4}$	73 $\frac{1}{4}$
22	6 2 $\frac{1}{4}$	176	143	121	99	77
23	6 3 $\frac{1}{4}$	184	149 $\frac{1}{4}$	126 $\frac{1}{4}$	103 $\frac{1}{4}$	80 $\frac{1}{4}$
24	6 7	192	156	132	108	84
25	6 10 $\frac{1}{4}$	200	162 $\frac{1}{4}$	137 $\frac{1}{4}$	112 $\frac{1}{4}$	87 $\frac{1}{4}$
List Price in Cents per Square Foot		41	42	46	50	57

PRINCESS UNION—STEAM and WATER



DIMENSIONS IN INCHES

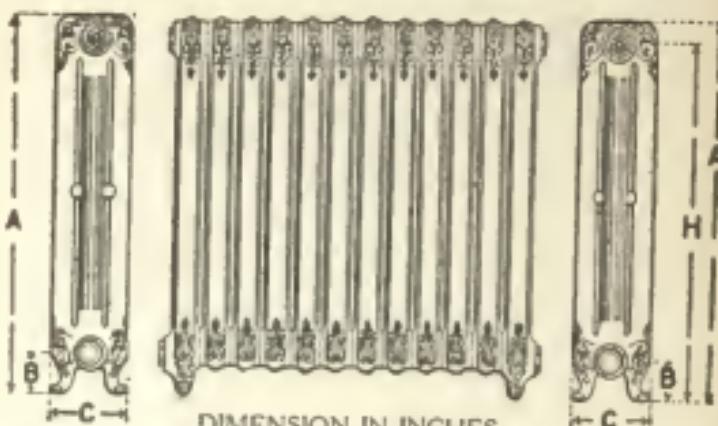
A	Height of Radiator	45	37	31	25	19
H	Height of Top Tapping .	43	35 $\frac{1}{2}$	29 $\frac{1}{2}$	23	17 $\frac{3}{4}$
B	Height of Regular Tapping.....			4 $\frac{1}{8}$ inches		
C	Width of Section.....			9 "		

LIST OF SIZES

Number of Sections	Total Length		RADIATING SURFACE (Square Feet)				
	Feet	Inches	45 in. High	37 in. High	31 in. High	25 in. High	19 in. High
3	0	10 $\frac{1}{4}$	24	19 $\frac{1}{2}$	16 $\frac{1}{2}$	13 $\frac{1}{2}$	10 $\frac{1}{4}$
4	1	2	32	26	22	18	14
5	1	5 $\frac{1}{4}$	40	32 $\frac{1}{2}$	27 $\frac{1}{2}$	22 $\frac{1}{2}$	17 $\frac{1}{2}$
6	1	8 $\frac{1}{2}$	48	39	33	27	21
7	1	11 $\frac{1}{4}$	56	45 $\frac{1}{2}$	38 $\frac{1}{2}$	31 $\frac{1}{2}$	24 $\frac{1}{2}$
8	2	3	64	52	44	36	28
9	2	6 $\frac{1}{4}$	72	58 $\frac{1}{2}$	49 $\frac{1}{2}$	40 $\frac{1}{2}$	31 $\frac{1}{2}$
10	2	9 $\frac{1}{2}$	80	65	55	45	35
11	3	3 $\frac{1}{4}$	88	71 $\frac{1}{2}$	60 $\frac{1}{2}$	49 $\frac{1}{2}$	38 $\frac{1}{2}$
12	3	4	96	78	66	54	42
13	3	7 $\frac{1}{4}$	104	84 $\frac{1}{2}$	71 $\frac{1}{2}$	58 $\frac{1}{2}$	45 $\frac{1}{2}$
14	3	10 $\frac{1}{4}$	112	91	77	63	49
15	4	1 $\frac{1}{4}$	120	97 $\frac{1}{2}$	82 $\frac{1}{2}$	67 $\frac{1}{2}$	52 $\frac{1}{2}$
16	4	5	128	104	88	72	56
17	4	8 $\frac{1}{4}$	136	110 $\frac{1}{2}$	93 $\frac{1}{2}$	76 $\frac{1}{2}$	59 $\frac{1}{2}$
18	4	11 $\frac{1}{2}$	144	117	99	81	63
19	5	2 $\frac{1}{4}$	152	123 $\frac{1}{2}$	104 $\frac{1}{2}$	85 $\frac{1}{2}$	66 $\frac{1}{2}$
20	5	6	160	130	110	90	70
21	5	9 $\frac{1}{4}$	168	136 $\frac{1}{2}$	115 $\frac{1}{2}$	94 $\frac{1}{2}$	73 $\frac{1}{2}$
22	6	3 $\frac{1}{4}$	176	143	121	99	77
23	6	3 $\frac{3}{4}$	184	149 $\frac{1}{2}$	126 $\frac{1}{2}$	103 $\frac{1}{2}$	80 $\frac{1}{2}$
24	6	7	192	156	132	108	84
25	6	10 $\frac{1}{4}$	200	162 $\frac{1}{2}$	137 $\frac{1}{2}$	112 $\frac{1}{2}$	87 $\frac{1}{2}$

List Price in Cents per Square Foot	41	42	46	50	57
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ROYAL UNION—STEAM or WATER



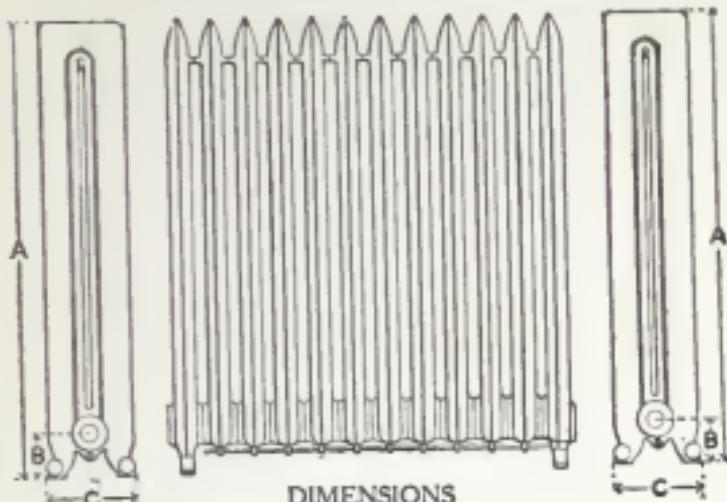
DIMENSION IN INCHES

A	Height of Radiator	44	38	30	24	18
H	Height of Top Tapping ..	41 $\frac{1}{8}$	35 $\frac{7}{8}$	27 $\frac{1}{2}$	21 $\frac{1}{2}$	15 $\frac{1}{2}$
B	Height of Regular Tapping.....				4 $\frac{5}{8}$	inches
C	Width of Section.....				8 $\frac{5}{8}$	"

LIST OF SIZES

Number of Sections	Total Length		RADIATING SURFACE (Square Feet)				
	Feet	Inches	44 in. High	38 in. High	30 in. High	24 in. High	18 in. High
3	0	10	18	15	12	9	6
4	1	1	24	20	16	12	8
5	1	4	30	25	20	15	10
6	1	7	36	30	24	18	12
7	1	10	42	35	28	21	14
8	2	1	48	40	32	24	16
9	2	4	54	45	36	27	18
10	2	7	60	50	40	30	20
11	2	10	66	55	44	33	22
12	3	1	72	60	48	36	24
13	3	4	78	65	52	39	26
14	3	7	84	70	56	42	28
15	3	10	90	75	60	45	30
16	4	1	96	80	64	48	32
17	4	4	102	85	68	51	34
18	4	7	108	90	72	54	36
19	4	10	114	95	76	57	38
20	5	1	120	100	80	60	40
21	5	4	126	105	84	63	42
22	5	7	132	110	88	66	44
23	5	10	138	115	92	69	46
24	6	1	144	120	96	72	48
25	6	4	150	125	100	75	50
List Price in Cents per Square Foot			41	42	46	50	58

SCEPTER—STEAM ONLY



A Height of Radiator (See table below)
B Height of Regular Tapping 5 inches
C Width of Section 7 "

LIST OF SIZES

Number of Sections	Total Length Feet Inches	RADIATING SURFACE (Square Feet)				
		44 in. High	38 in. High	30 in. High	24 in. High	18 in. High
3	0 8 1/2	14 1/4	12	9	7	5
4	0 10 1/2	19	16	12	9 1/2	6 1/2
5	1 7/8	23 3/4	20	15	11 1/2	8 1/2
6	1 3 1/4	28 1/2	24	18	14	10
7	1 5 3/8	33 1/4	28	21	16 1/2	11 1/2
8	1 8	38	32	24	18 3/8	13 1/2
9	1 10 1/2	42 1/4	36	27	21	15
10	2 3/4	47 1/2	40	30	23 1/2	16 1/2
11	2 3 1/2	52 1/4	44	33	25 1/2	18 1/2
12	2 5 1/2	57	48	36	28	20
13	2 7 1/4	61 1/4	52	39	30 1/2	21 1/2
14	2 10 1/4	66 1/2	56	42	32 1/2	23 1/2
15	3 3 1/2	71 1/4	60	45	35	25
16	3 3	76	64	48	37 1/2	26 1/2
17	3 5 3/8	80 1/4	68	51	39 1/2	28 1/2
18	3 7 1/4	85 1/2	72	54	42	30
19	3 10 1/2	90 1/4	76	57	44 1/2	31 1/2
20	4 5/8	95	80	60	46 1/2	33 1/2
21	4 2 1/2	99 1/4	84	63	49	35
22	4 5 3/8	104 1/2	88	66	51 1/2	36 1/2
23	4 7 1/2	109 1/4	92	69	53 1/2	38 1/2
24	4 10	114	96	72	56	40
25	5 3 1/2	118 1/4	100	75	58 1/2	41 1/2
List Price in Cents per Square Foot		41	42	46	50	58

CORONET—STEAM and WATER
SINGLE COLUMN

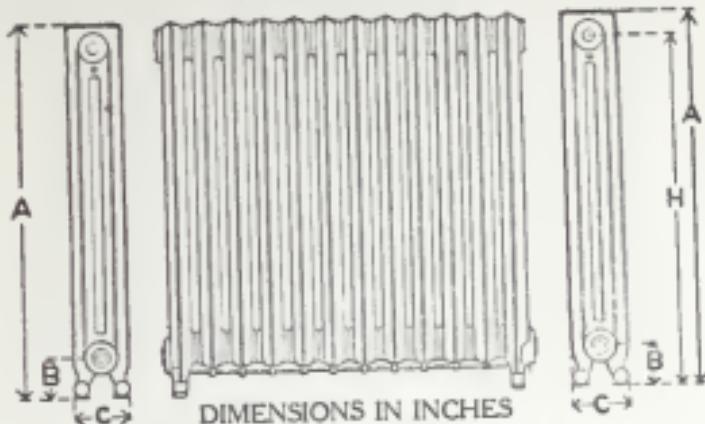
A Height of Radiator	45	37	31	25	19
H Height of Top Tapping	43 1/2	34 1/2	28 1/2	23 1/2	17 1/2
B Height of Regular Tapping				4 1/2 inches	
C Width of Section				5 3/4 "	

LIST OF SIZES

Number of Sections	Total Length Feet Inches	RADIATING SURFACE (Square Feet)				
		45 in. High	37 in. High	31 in. High	25 in. High	19 in. High
1	0 18	19 1/2	17 1/2	6	3 1/2	6
4	1 1	18	14	10	10	8
1	1 4	21 1/2	17 1/2	18	12 1/2	10
1	1 7	27	21	18	15	11
2	1 1	11 1/2	24 1/2	12	17 1/2	14
2	2 1	36	28	14	20	16
2	2 4	40 1/2	31 1/2	20	22 1/2	18
2	2 7	45	35	20	25	20
2	3 1	40 1/2	36 1/2	22	27 1/2	22
3	1 4	14	42	15	30	24
3	3 4	58 1/2	47 1/2	33	55 1/2	46
3	3 7	63	49	4	57	48
3	3 10	67 1/2	53 1/2	4	61 1/2	52
4	1 1	32	7	40	40	31
4	4 4	80 1/2	66 1/2	31	65 1/2	54
4	4 7	85	68	34	68	57
4	4 10	88 1/2	70 1/2	37	70 1/2	60
4	1 4	36	27 1/2	12	24 1/2	21
4	3 4	50	37	20	33	28
4	3 7	54 1/2	40 1/2	24	37 1/2	31
4	3 10	58 1/2	43 1/2	27	40 1/2	34
4	4 4	64	47	31	47	37
4	4 7	68	49	34	48	39
4	4 10	72 1/2	51 1/2	37	50 1/2	42
4	1 4	32	23 1/2	10	17 1/2	16
4	3 4	46	33	18	25	20
4	3 7	50 1/2	36 1/2	21	27 1/2	24
4	3 10	54 1/2	39 1/2	24	30 1/2	27
4	4 4	60	42	27	40	32
4	4 7	64	44	30	42	33
4	4 10	68 1/2	47 1/2	33	45 1/2	36

Last Price in Cents per
Square Foot

41 42 46 50 57

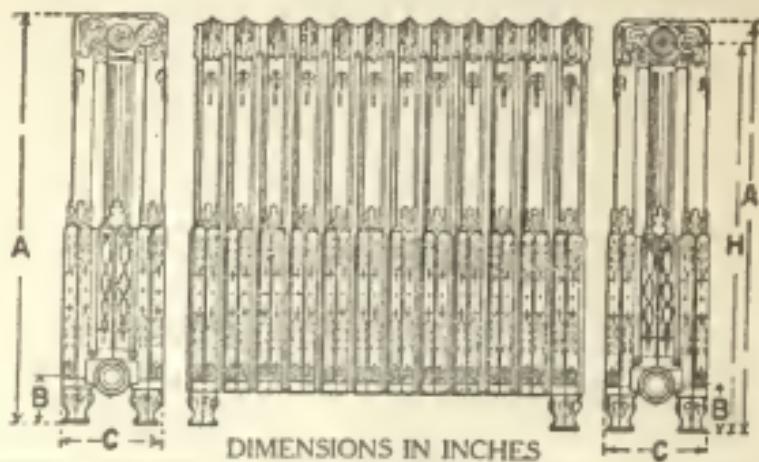
DIADEM—STEAM and WATER
SINGLE COLUMN

A	Height of Radiator	45	37	31	25	19
H	Height of Top Tapping	43 $\frac{3}{8}$	34 $\frac{1}{8}$	28 $\frac{1}{8}$	23 $\frac{1}{8}$	17 $\frac{1}{8}$
B	Height of Regular Tapping				4 $\frac{3}{8}$ inches	
C	Width of Section				5 $\frac{1}{4}$ "	

LIST OF SIZES

Number of Sections	Total Length		RADIATING SURFACE (Square Feet)				
	Feet	Inches	45 in. High	37 in. High	31 in. High	25 in. High	19 in. High
3	0	10	13 $\frac{1}{4}$	10 $\frac{1}{4}$	9	7 $\frac{1}{2}$	6
4	1	1	18	14	12	10	8
5	1	4	22 $\frac{1}{4}$	17 $\frac{1}{2}$	15	12 $\frac{1}{2}$	10
6	1	7	27	21	18	15	12
7	1	10	31 $\frac{1}{4}$	24 $\frac{1}{2}$	21	17 $\frac{1}{2}$	14
8	2	1	36	28	24	20	16
9	2	4	40 $\frac{1}{4}$	31 $\frac{1}{4}$	27	22 $\frac{1}{4}$	18
10	2	7	45	35	30	25	20
11	2	10	49 $\frac{1}{4}$	38 $\frac{1}{2}$	33	27 $\frac{1}{4}$	22
12	3	1	54	42	36	30	24
13	3	4	58 $\frac{1}{4}$	45 $\frac{1}{2}$	39	32 $\frac{1}{2}$	26
14	3	7	63	49	42	35	28
15	3	10	67 $\frac{1}{2}$	52 $\frac{1}{4}$	45	37 $\frac{1}{4}$	30
16	4	1	72	56	48	40	32
17	4	4	76 $\frac{1}{2}$	59 $\frac{1}{2}$	51	42 $\frac{1}{4}$	34
18	4	7	81	63	54	45	36
19	4	10	85 $\frac{1}{4}$	66 $\frac{1}{4}$	57	47 $\frac{1}{4}$	38
20	5	1	90	70	60	50	40
21	5	4	94 $\frac{1}{4}$	73 $\frac{1}{2}$	63	52 $\frac{1}{4}$	42
22	5	7	99	77	66	55	44
23	5	10	103 $\frac{1}{4}$	80 $\frac{1}{2}$	69	57 $\frac{1}{2}$	46
24	6	1	108	84	72	60	48
25	6	4	112 $\frac{1}{4}$	87 $\frac{1}{2}$	75	62 $\frac{1}{2}$	50
List Price in Cents per Square Foot			41	42	46	50	57

SOVEREIGN UNION—STEAM or WATER



A	Height of Radiator.....	37	31	25
H	Height of Top Tapping...	35 1/2	29 9/16	23 1/2
B	Height of Regular Tapping.....	5	inches	
C	Width of Section.....	8 1/4	"	

LIST OF SIZES

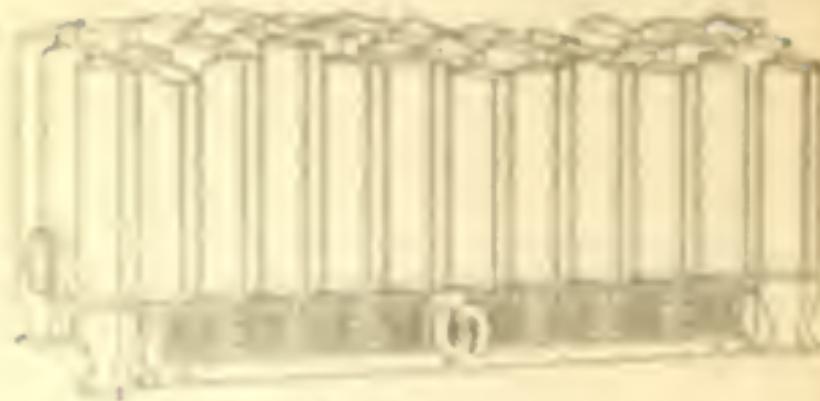
Number of Sections	Total Length		RADIATING SURFACE (Square Feet)		
	Feet	Inches	37 in. High	31 in. High	25 in. High
3	0	9 1/8	18	15	12
4	0	11 3/4	24	20	16
5	1	2 1/8	30	25	20
6	1	5 1/8	36	30	24
7	1	7 1/8	42	35	28
8	1	10 1/2	48	40	32
9	2	1 1/8	54	45	36
10	2	3 3/4	60	50	40
11	2	6 1/8	66	55	44
12	2	9 1/4	72	60	48
13	2	11 1/8	78	65	52
14	3	2 3/4	84	70	56
15	3	5 1/8	90	75	60
16	3	8	96	80	64
17	3	10 1/2	102	85	68
18	4	1 1/8	108	90	72
19	4	4 1/8	114	95	76
20	4	6 1/4	120	100	80
21	4	9 1/8	126	105	84
22	5	1 1/4	132	110	88
23	5	2 1/8	138	115	92
24	5	5 1/8	144	120	96
25	5	8 1/8	150	125	100
List Price in Cents per Square Foot			42	46	50

UNION
DAMPER BASE

FOR

SOVEREIGN RADIATOR ONLY

THE H. B. SMITH CO.
UNION DAMPER BASE
FOR SOVEREIGN RADIATOR ONLY



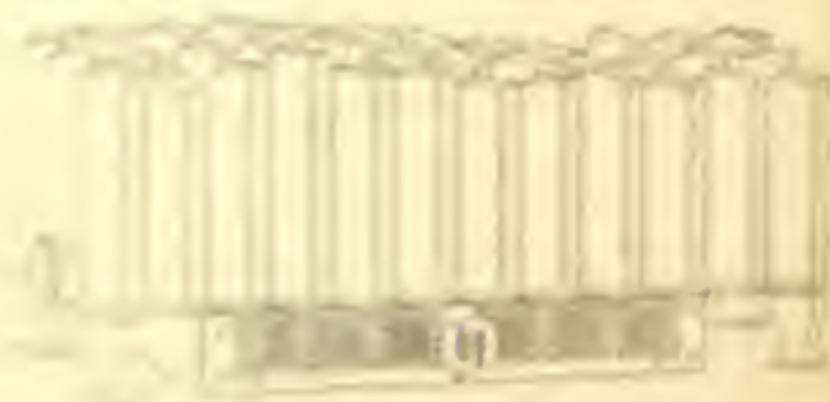
2 Section Radiator
B Section Full Length Base

SPECIAL NOTICE

Radiators 24 per cent and longer have center leg. When center leg is used, base cannot extend the full length of Radiator.

When Radiator longer than 20 sections is required to have front center center of Radiator special on order and base must be 1/2 longer than two center legs, giving the distance the same as between center legs.

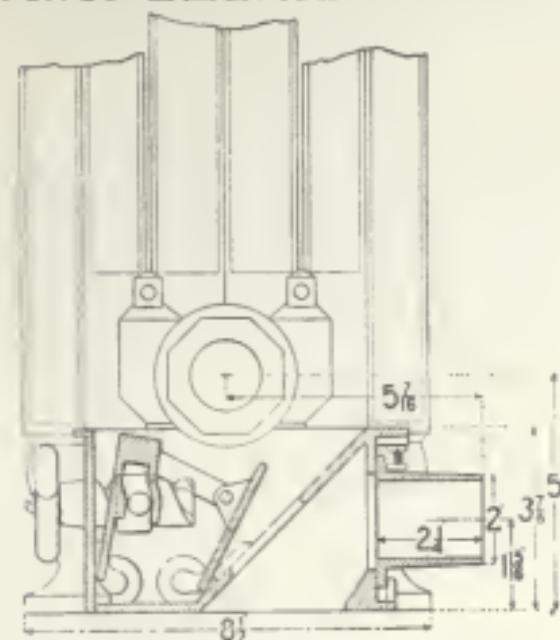
Specify on order (in sections) length of Base.
Total Radiator distance is 216 inches in length



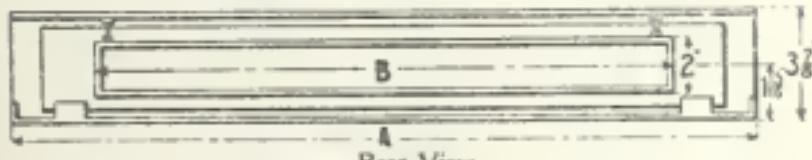
10 Section Radiator
B Section Base

THE H. B. SMITH CO.

UNION DAMPER BASE
FOR SOVEREIGN RADIATOR ONLY



Showing Construction and Method of Operation



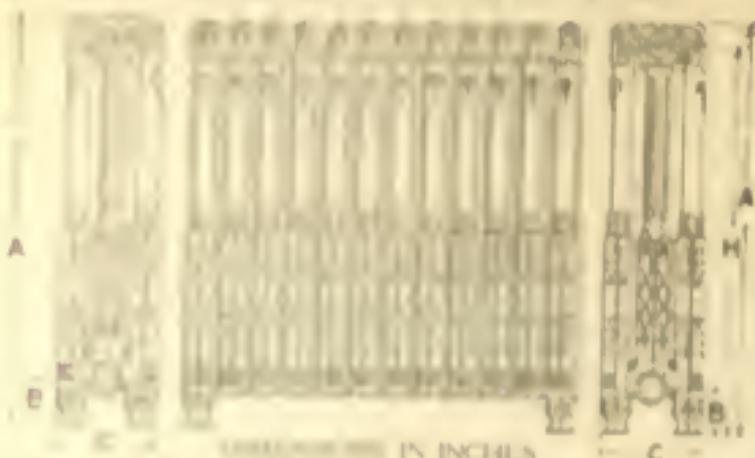
Rear View

DIMENSIONS

Length of Base in number of Sovereign Sections	A Length of Base	B Length of Thimble	Price
4	10 1/4"	6 1/8"	\$2.50
5	13"	6 1/8"	3.00
6	15 5/8"	9 1/8"	3.50
7	18 3/8"	11 1/8"	4.00
8	21"	14 1/8"	4.50
9	23 3/4"	17"	5.00
10	26 1/4"	19 1/8"	5.50
11	29"	19 1/8"	6.00
12	31 3/4"	19 1/8"	6.50
13	34 1/2"	19 1/8"	7.00
14	37 1/4"	19 1/8"	7.50
15	39 3/4"	19 1/8"	8.00
16	42 1/2"	19 1/8"	8.50
17	45 1/4"	19 1/8"	9.00
18	47 3/4"	19 1/8"	9.50

THE H. B. SMITH CO.

SOVEREIGN STEAM or WATER



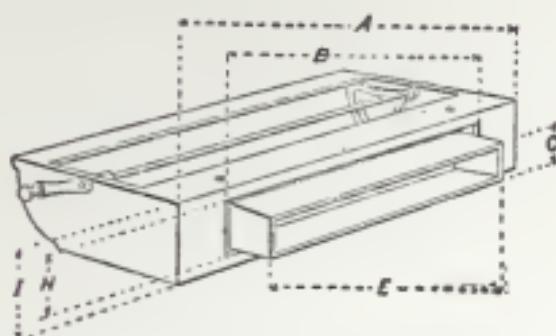
— E — DIMENSIONS IN INCHES — C —

A	Height of Boiler	51	31	15
H	Front End Top Plate	51	29	15
B	Width of Boiler			5 inches
C	Depth of Boiler			8 1/2 —

LETS OF SIZE

LETS OF SIZE	SQUARE FEET	BOILER SURFACE		SQUARE FEET	
		15 in. High	29 in. High	15 in. High	29 in. High
1	1.5	1.5	1.5	1.5	1.5
2	3.0	3.0	3.0	3.0	3.0
3	4.5	4.5	4.5	4.5	4.5
4	6.0	6.0	6.0	6.0	6.0
5	7.5	7.5	7.5	7.5	7.5
6	9.0	9.0	9.0	9.0	9.0
7	10.5	10.5	10.5	10.5	10.5
8	12.0	12.0	12.0	12.0	12.0
9	13.5	13.5	13.5	13.5	13.5
10	15.0	15.0	15.0	15.0	15.0
11	16.5	16.5	16.5	16.5	16.5
12	18.0	18.0	18.0	18.0	18.0
13	19.5	19.5	19.5	19.5	19.5
14	21.0	21.0	21.0	21.0	21.0
15	22.5	22.5	22.5	22.5	22.5
16	24.0	24.0	24.0	24.0	24.0
17	25.5	25.5	25.5	25.5	25.5
18	27.0	27.0	27.0	27.0	27.0
19	28.5	28.5	28.5	28.5	28.5
20	30.0	30.0	30.0	30.0	30.0

DETACHED BASE AND DAMPER



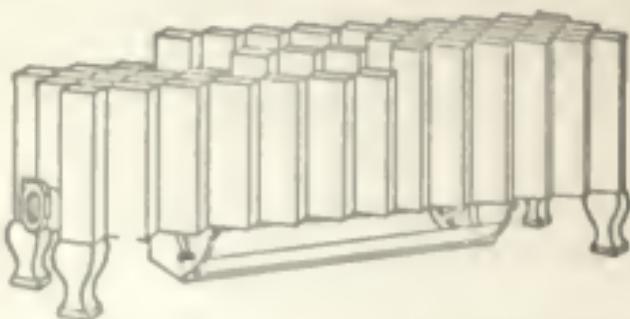
Rear of Base Air Inlet through back
Damper open to admit outside air

LIST OF SIZES

- 1 Length of Base.
- 2 Length of back opening to receive Thimble.
- 3 Height of Thimble (2 inches).
- 4 Length of Base in number of Sovereign Union Sections.
- 5 Length of Thimble.
- 6 Height of back opening to receive Thimble (2½ inches).
- 7 Height of Base (3½ inches).

D	A	B	E	Price
4 Sections	9½"	7½"	6½"	\$2.50
5 "	13½"	8½"	6½"	3.00
6 "	16"	10½"	9½"	3.50
7 "	18½"	13½"	11½"	4.00
8 "	21½"	15½"	14½"	4.50
9 "	24½"	18½"	17"	5.00
10 "	26½"	21½"	19½"	5.50
11 "	29½"	23½"	22½"	6.00
12 "	31½"	26½"	25½"	6.50
13 "	34½"	28½"	27½"	7.00
14 "	37½"	31½"	30½"	7.50
15 "	40"	34½"	32½"	8.00
16 "	43½"	37½"	35½"	8.50
17 "	45½"	39½"	37½"	9.00
18 "	48½"	39½"	37½"	9.50

DETACHED BASE AND DAMPER



11 SECTION RADIATOR—7 SECTION BASE (18 $\frac{1}{2}$ " long)
Handle for operating at end of Base

SPECIAL NOTICE

DETACHED BASE AND DAMPER IS USED WITH
SOVEREIGN UNION RADIATOR ONLY

Radiators 21 Sections and longer have center leg

When ~~center~~ leg is ~~used~~ Base with Damper cannot extend the full length of Radiator

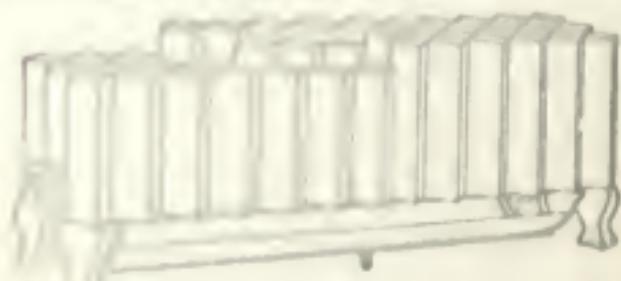
When Radiator is longer than 20 Sections, is required to have Base with ~~center~~ leg at center of Radiator specify on order that Radiator be delivered with center leg, giving the distance (in Sections) from front to center leg

When Base extends full distance between legs the Damper is supplied by ~~Handle~~ (page 11) at center of Damper

When Base does not extend full length between legs the Damper is supplied by ~~Handle~~ (page 11) at end of Base

When Radiator is shorter than 20 Sections, Base will be shaped with air inlet and ~~Handle~~ at end

When Radiator is longer than 20 Sections "D" (length of Base) (See page 9) from Radiator front to ~~Handle~~ length



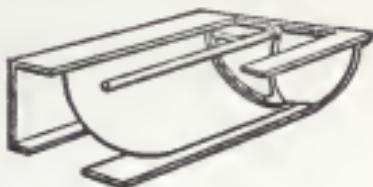
BASE FULL LENGTH OF RADIATOR

11 SECTION Radiator 11 section Base (29 $\frac{1}{2}$ " long) Handle for operating at center of Damper

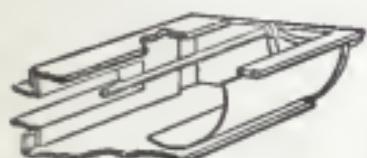
DETACHED BASE AND DAMPER



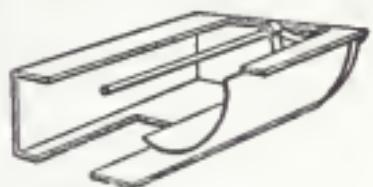
Damper closed to admit air from room



Damper closed to admit outside air



Damper open to admit air from room



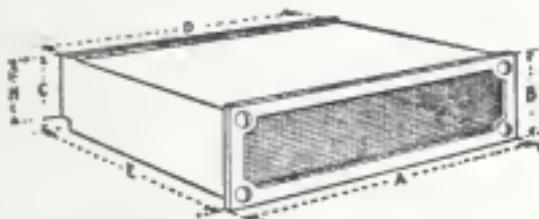
Damper open to admit outside air

AIR INLET THROUGH BACK

AIR INLET THROUGH FLOOR

Unless otherwise specified, Base will be shipped with air inlet through back.

WALL BOX

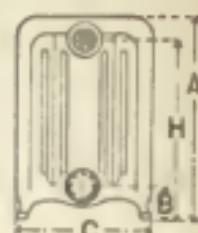
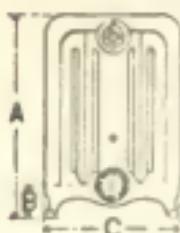


DIMENSIONS IN INCHES

SIZES	A	B	C	D	E	H	Price
2" x 12"	13	3	2 $\frac{7}{16}$	12 $\frac{1}{4}$	9	1 $\frac{7}{8}$	\$2.00
2" x 16"	17	3	2 $\frac{7}{16}$	16 $\frac{1}{2}$	9	1 $\frac{7}{8}$	\$2.50
2" x 20"	20 $\frac{1}{2}$	3	2 $\frac{7}{16}$	20 $\frac{1}{2}$	9	1 $\frac{7}{8}$	\$3.00

FIVE-COLUMN PRINCESS

(Window Radiator)



DIMENSIONS IN INCHES

A	Height of Radiator.....	16	14	12
H	Height of Top Tapping...	14	12	10
B	Height of Regular Tapping.....		3 inches	
C	Width of Section		12 "	

LIST OF SIZES

Number of Sections	Total Length		RADIATING SURFACE (Square Feet)	
	Feet	Inches	12 in. High	14 in. High
3	0	10 1/4	10	12
4	1	2	13 1/4	16
5	1	5 1/4	16	20
6	1	8 1/4	20	24
7	1	11 1/4	23 1/4	28
8	2	3	26	32
9	2	6 1/4	30	36
10	2	9 1/4	33 1/4	40
11	3	0 1/4	36	44
12	3	4 1/4	40	48
13	3	7 1/4	43	52
14	3	10 1/4	46	56
15	4	1 1/4	50	60
16	4	5	53	64
17	4	8 1/4	56	68
18	4	11 1/4	60	72
19	5	2 1/4	63	76
20	5	6	66	80
21	5	9 1/4	70	84
22	6	0 1/4	73	88
23	6	3 1/4	76	92
24	6	7	80	96
25	6	10 1/4	83	100
List Price in Cents per Square Foot		60	64	68

Two Column
IMPERIAL AND
PRINCESS

Five Column
PRINCESS

RADIATORS

NOTICE

These Radiators will be ready for shipment
about July 1st, 1907

THE H. B. SMITH CO.

TWO COLUMN IMPERIAL
STEAM or WATER



Dimensions in inches

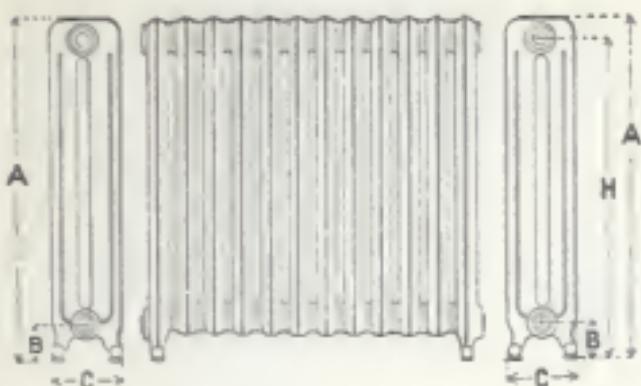
- ▲ Height of Radiator 41 37 31 25 11
- ▲ Height of Top Trapping 43 36 29 22 17
- ▲ Height of Regular Trapping 4 1/2 inches
- ▲ Width of Radiator

LIST OF SIZES

Size	Width of Radiator	RADIATING SURFACE			Capacity (Gallons)	
		1/2 in.	1 in.	1 1/2 in.	1/2 in.	1 in.
1	4	12	18	24	9	16
2	4	24	36	54	31	56
3	4	36	54	81	51	112
4	4	48	72	108	61	132
5	4	60	90	135	71	154
6	4	72	108	162	81	174
7	4	84	126	189	91	194
8	4	96	144	216	101	214
9	4	108	162	243	111	234
10	4	120	180	270	121	254
11	4	132	198	318	131	274
12	4	144	216	360	141	294
13	4	156	234	408	151	314
14	4	168	252	456	161	334
15	4	180	270	504	171	354
16	4	192	288	552	181	374
17	4	204	306	600	191	394
18	4	216	324	648	201	414
19	4	228	342	696	211	434
20	4	240	360	744	221	454
21	4	252	378	792	231	474
22	4	264	396	840	241	494
23	4	276	414	888	251	514
24	4	288	432	936	261	534
25	4	300	450	984	271	554
26	4	312	468	1032	281	574
27	4	324	486	1080	291	594
28	4	336	504	1128	301	614
29	4	348	522	1176	311	634
30	4	360	540	1224	321	654
31	4	372	558	1272	331	674
32	4	384	576	1320	341	694
33	4	396	594	1368	351	714
34	4	408	612	1416	361	734
35	4	420	630	1464	371	754
36	4	432	648	1512	381	774
37	4	444	666	1560	391	794
38	4	456	684	1608	401	814
39	4	468	702	1656	411	834
40	4	480	720	1704	421	854
41	4	492	738	1752	431	874
42	4	504	756	1800	441	894
43	4	516	774	1848	451	914
44	4	528	792	1896	461	934
45	4	540	810	1944	471	954
46	4	552	828	1992	481	974
47	4	564	846	2040	491	994
48	4	576	864	2088	501	1014
49	4	588	882	2136	511	1034
50	4	600	900	2184	521	1054
51	4	612	918	2232	531	1074
52	4	624	936	2280	541	1094
53	4	636	954	2328	551	1114
54	4	648	972	2376	561	1134
55	4	660	990	2424	571	1154
56	4	672	1008	2472	581	1174
57	4	684	1026	2520	591	1194
58	4	696	1044	2568	601	1214
59	4	708	1062	2616	611	1234
60	4	720	1080	2664	621	1254
61	4	732	1098	2712	631	1274
62	4	744	1116	2760	641	1294
63	4	756	1134	2808	651	1314
64	4	768	1152	2856	661	1334
65	4	780	1170	2904	671	1354
66	4	792	1188	2952	681	1374
67	4	804	1206	3000	691	1394
68	4	816	1224	3048	701	1414
69	4	828	1242	3096	711	1434
70	4	840	1260	3144	721	1454
71	4	852	1278	3192	731	1474
72	4	864	1296	3240	741	1494
73	4	876	1314	3288	751	1514
74	4	888	1332	3336	761	1534
75	4	900	1350	3384	771	1554
76	4	912	1368	3432	781	1574
77	4	924	1386	3480	791	1594
78	4	936	1404	3528	801	1614
79	4	948	1422	3576	811	1634
80	4	960	1440	3624	821	1654
81	4	972	1458	3672	831	1674
82	4	984	1476	3720	841	1694
83	4	996	1494	3768	851	1714
84	4	1008	1512	3816	861	1734
85	4	1020	1530	3864	871	1754
86	4	1032	1548	3912	881	1774
87	4	1044	1566	3960	891	1794
88	4	1056	1584	4008	901	1814
89	4	1068	1602	4056	911	1834
90	4	1080	1620	4104	921	1854
91	4	1092	1638	4152	931	1874
92	4	1104	1656	4190	941	1894
93	4	1116	1674	4238	951	1914
94	4	1128	1692	4286	961	1934
95	4	1140	1710	4334	971	1954
96	4	1152	1728	4382	981	1974
97	4	1164	1746	4430	991	1994
98	4	1176	1764	4478	1001	2014
99	4	1188	1782	4526	1011	2034
100	4	1200	1800	4574	1021	2054
101	4	1212	1818	4622	1031	2074
102	4	1224	1836	4670	1041	2094
103	4	1236	1854	4718	1051	2114
104	4	1248	1872	4766	1061	2134
105	4	1260	1890	4814	1071	2154
106	4	1272	1908	4862	1081	2174
107	4	1284	1926	4910	1091	2194
108	4	1296	1944	4958	1101	2214
109	4	1308	1962	5006	1111	2234
110	4	1320	1980	5054	1121	2254
111	4	1332	1998	5102	1131	2274
112	4	1344	2016	5150	1141	2294
113	4	1356	2034	5198	1151	2314
114	4	1368	2052	5246	1161	2334
115	4	1380	2070	5294	1171	2354
116	4	1392	2088	5342	1181	2374
117	4	1404	2106	5390	1191	2394
118	4	1416	2124	5438	1201	2414
119	4	1428	2142	5486	1211	2434
120	4	1440	2160	5534	1221	2454
121	4	1452	2178	5582	1231	2474
122	4	1464	2196	5630	1241	2494
123	4	1476	2214	5678	1251	2514
124	4	1488	2232	5726	1261	2534
125	4	1500	2250	5774	1271	2554
126	4	1512	2268	5822	1281	2574
127	4	1524	2286	5870	1291	2594
128	4	1536	2304	5918	1301	2614
129	4	1548	2322	5966	1311	2634
130	4	1560	2340	6014	1321	2654
131	4	1572	2358	6062	1331	2674
132	4	1584	2376	6110	1341	2694
133	4	1596	2394	6158	1351	2714
134	4	1608	2412	6206	1361	2734
135	4	1620	2430	6254	1371	2754
136	4	1632	2448	6302	1381	2774
137	4	1644	2466	6350	1391	2794
138	4	1656	2484	6398	1401	2814
139	4	1668	2502	6446	1411	2834
140	4	1680	2520	6494	1421	2854
141	4	1692	2538	6542	1431	2874
142	4	1704	2556	6590	1441	2894
143	4	1716	2574	6638	1451	2914
144	4	1728	2592	6686	1461	2934
145	4	1740	2610	6734	1471	2954
146	4	1752	2628	6782	1481	2974
147	4	1764	2646	6830	1491	2994
148	4	1776	2664	6878	1501	3014
149	4	1788	2682	6926	1511	3034
150	4	1800	2700	6974	1521	3054
151	4	1812	2718	7022	1531	3074
152	4	1824	2736	7070	1541	3094
153	4	1836	2754	7118	1551	3114
154	4	1848	2772	7166	1561	3134
155	4	1860	2790	7214	1571	3154
156	4	1872	2808	7262	1581	3174
157	4	1884	2826	7310	1591	3194
158	4	1896	2844	7358	1601	3214
159	4	1908	2862	7406	1611	3234
160	4	1920	2880	7454	1621	3254
161	4	1932	2898	7492	1631	3274
162	4	1944	2916	7540	1641	3294
163	4	1956	2934	7588	1651	3314
164	4	1968	2952	7636	1661	3334
165	4	1980	2970	7684	1671	3354
166	4	1992	2988	7732	1681	3374
167	4	2004	3006	7780	1691	3394
168	4	2016	3024	7828	1701	3414
169	4	2028	3042	7876	1711	3434
170	4	2040	3060	7924	1721	3454
171	4	2052	3078	7972	1731	3474
172	4	2064	3096	8020	1741	3494
173	4	2076	3114	8068	1751	3514
174	4	2088	3132	8116	1761	3534
175	4	2100	3150	8164	1771	3554
176	4	2112	3168	8212	1781	3574
177	4	2124	3186	8260	1791	3594
178	4	2136	3204	8308	1801	3614
179	4	2148	3222	8356	1811	3634
180	4	2160	3240	8404	1821	3654
181	4	2172	3258	8452	1831	3674
182	4	2184	3276	8490	1841	3694
183	4	2196	3294	8538	1851	3714
184	4	2208	3312	8586	1861	3734
185	4	2220	3330	8634	1871	3754
186	4	2232	3348	8682	1881	3774
187	4	2244	3366	8730	1891	3794
188	4	2256	3384	8778	1901	3814
189	4	2268	3402	8826	1911	3834
190	4	2280	3420	8874</		

THE H. B. SMITH CO.

TWO COLUMN PRINCESS
STEAM or WATER



DIMENSIONS IN INCHES

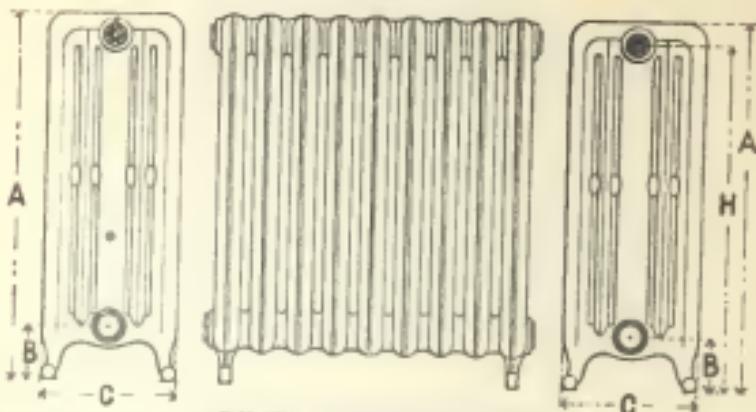
A	Height of Radiator	45	37	31	25	19
H	Height of Top Tapping	43 $\frac{1}{2}$	35 $\frac{1}{2}$	29 $\frac{1}{2}$	23 $\frac{1}{2}$	17 $\frac{1}{2}$
B	Height of Regular Tapping			4 $\frac{1}{2}$ inches		
C	Width of Section			7 "		

LIST OF SIZES

Number of Sections	Total Length		RADIATING SURFACE (Square Feet)				
	Feet	Inches	45 in. High	37 in. High	31 in. High	25 in. High	19 in. High
3	0	10	15	12	10 $\frac{1}{2}$	9	6 $\frac{1}{2}$
4	1	1	20	15	14	12	9
5	1	4	25	20	17 $\frac{1}{2}$	15	11 $\frac{1}{4}$
6	1	7	30	24	21	18	13 $\frac{1}{2}$
7	1	10	35	28	24 $\frac{1}{2}$	21	15 $\frac{3}{4}$
8	2	1	40	32	28	24	18
9	2	4	45	36	31 $\frac{1}{2}$	27	20 $\frac{1}{2}$
10	2	7	50	40	35	30	22 $\frac{1}{2}$
11	2	10	55	44	38 $\frac{1}{2}$	33	24 $\frac{3}{4}$
12	3	1	60	48	42	34	27
13	3	4	65	52	45 $\frac{1}{2}$	39	29 $\frac{1}{2}$
14	3	7	70	56	49	42	31 $\frac{1}{2}$
15	3	10	75	60	52 $\frac{1}{2}$	45	33 $\frac{3}{4}$
16	4	1	80	64	56	48	36
17	4	4	85	68	59 $\frac{1}{2}$	51	38 $\frac{1}{4}$
18	4	7	90	72	63	54	40 $\frac{1}{2}$
19	4	10	95	76	66 $\frac{1}{2}$	57	42 $\frac{3}{4}$
20	5	1	100	80	70	60	45
21	5	4	105	84	73 $\frac{1}{2}$	63	47 $\frac{1}{4}$
22	5	7	110	88	77	66	49 $\frac{1}{4}$
23	5	10	115	92	80 $\frac{1}{2}$	69	51 $\frac{1}{4}$
24	6	1	120	96	84	72	54
25	6	4	125	100	87 $\frac{1}{2}$	75	56 $\frac{1}{4}$
List Price in Cents per Square Foot		41	42	46	50	57	

THE H. B. SMITH CO.

FIVE COLUMN PRINCESS
STEAM and WATER



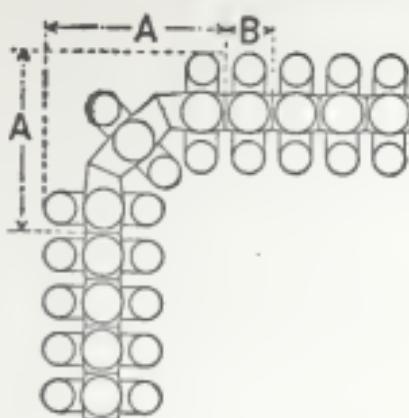
DIMENSIONS IN INCHES

A Height of Radiator	37	25
H Height of Top Tapping..	35	23
B Height of Regular Tapping.....	4 $\frac{1}{2}$ inches	
C Width of Section	12	"

LIST OF SIZES

Number of Sections	Total Length		RADIATING SURFACE (Square Feet)	
	Feet	Inches	37 in. High	25 in. High
3	0	10 $\frac{3}{4}$	30	21
4	1	2	40	28
5	1	5 $\frac{3}{4}$	50	35
6	1	8 $\frac{3}{4}$	60	42
7	1	11 $\frac{3}{4}$	70	49
8	2	3	80	56
9	2	6 $\frac{1}{4}$	90	63
10	2	9 $\frac{3}{4}$	100	70
11	3	3 $\frac{1}{4}$	110	77
12	3	4	120	84
13	3	7 $\frac{3}{4}$	130	91
14	3	10 $\frac{3}{4}$	140	98
15	4	1 $\frac{1}{4}$	150	105
16	4	5	160	112
17	4	8 $\frac{3}{4}$	170	119
18	4	11 $\frac{3}{4}$	180	126
19	5	2 $\frac{1}{4}$	190	133
20	5	6	200	140
21	5	9 $\frac{3}{4}$	210	147
22	6	3 $\frac{1}{4}$	220	154
23	6	3 $\frac{3}{4}$	230	161
24	6	7	240	168
25	6	10 $\frac{3}{4}$	250	175
List Price in Cents per Square Foot		42	50	

CORNER RADIATOR



If the total number of sections in CORNER RADIATOR is odd (9, 11, 13, 15, etc.), each arm of the Radiator can be made of the same length. If, however, the Radiator contains an even number of Sections (8, 10, 12, 14, etc.), one arm must be longer than the other, in which case it is necessary to send a sketch, showing which arm is to contain the extra section, also which end is to be used for supply and which end for return.

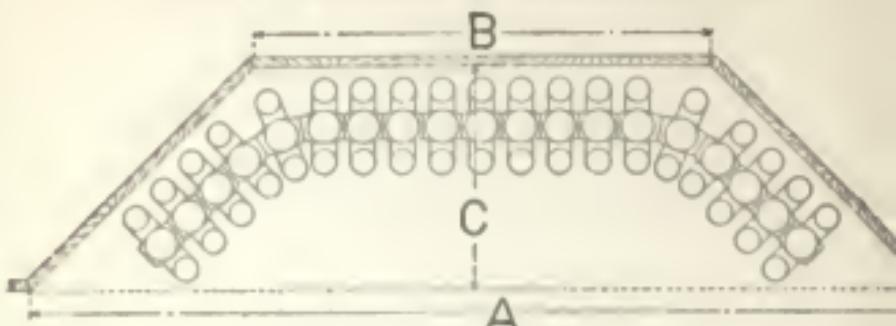
Corner Radiators are made only in the styles indicated below:

DIMENSIONS

STYLE	A	B
Imperial Union.....		
Princess Union.....	12 $\frac{1}{2}$ "	3 $\frac{1}{4}$ "
Royal Union	12"	3"
Coronet		
Diadem	9 $\frac{3}{4}$ "	3"

PRICE: Add \$3.00 NET per Radiator to regular price

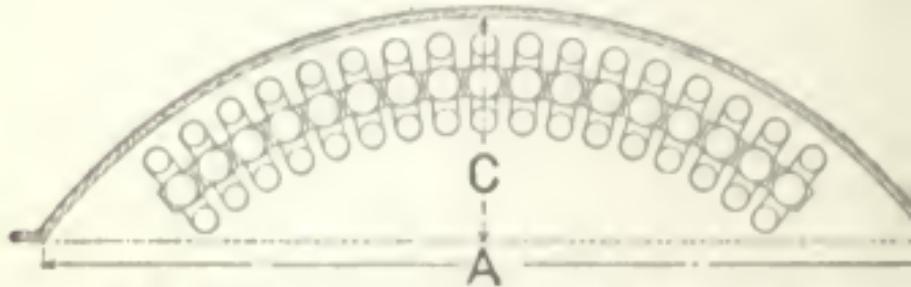
BAY WINDOW RADIATOR



BAY WINDOW RADIATORS can be assembled in any desired size and on any desired angle. In ordering, specify the size of Radiator required (either in number of sections, or in square feet of surface), and the dimensions "A," "B," and "C."

PRICE: Add \$6.00 NET per Radiator to regular price
(-\$3.00 NET for each angle)

CURVED RADIATOR



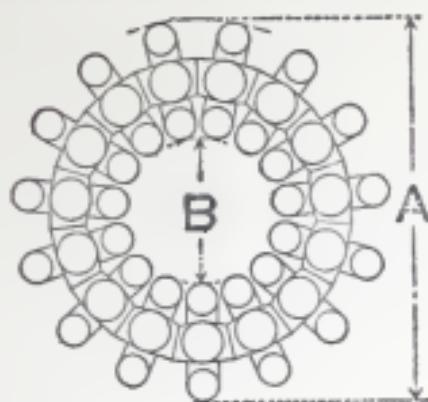
CURVED RADIATORS can be assembled in any desired size or on any desired radius. In ordering, specify the size of Radiator required (either in number of sections or in square feet of surface), and the dimensions "A" and "C."

PRICE: Add \$6.00 NET per Section to regular price

Bay Window and Curved Radiators are made only in the following styles:

Single Column Radiators	CORONET AND DIadem.
Three Column Radiators	IMPERIAL UNION,
	PRINCESS UNION AND ROYAL UNION.
Five Column Radiator	FIVE COLUMN PRINCESS.

CIRCULAR RADIATOR



CIRCULAR RADIATORS can be assembled as one whole Radiator, or they can be assembled in halves for the purpose of encircling columns.

When Circular Radiators are in halves, each half becomes an independent Radiator. In ordering specify which method of assembling is desired.

Circular Radiators are made only in the styles and sizes indicated below:

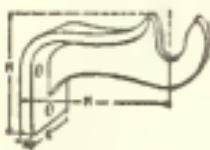
DIMENSIONS IN INCHES

Number of Sections	IMPERIAL UNION and PRINCESS UNION		CORONET and DIADEM	
	A Outside Diameter	B Inside Diameter	A Outside Diameter	B Inside Diameter
9	24 $\frac{1}{4}$ In.	4 $\frac{1}{4}$ In.	18 $\frac{1}{4}$ In.	6 $\frac{1}{4}$ In.
12	27 "	7 "	20 $\frac{1}{4}$ "	8 $\frac{1}{4}$ "
15	29 "	9 "	22 $\frac{1}{4}$ "	10 $\frac{1}{4}$ "
18	30 $\frac{1}{4}$ "	10 $\frac{1}{4}$ "	24 $\frac{1}{4}$ "	12 $\frac{1}{4}$ "
20	32 $\frac{1}{4}$ "	12 $\frac{1}{4}$ "	25 $\frac{1}{4}$ "	13 $\frac{1}{4}$ "
24	35 $\frac{1}{4}$ "	15 $\frac{1}{4}$ "	28 "	15 $\frac{1}{2}$ "
30	40 $\frac{1}{4}$ "	20 $\frac{1}{4}$ "	32 $\frac{1}{4}$ "	20 $\frac{1}{4}$ "
36	44 $\frac{1}{4}$ "	24 $\frac{1}{4}$ "	35 $\frac{1}{4}$ "	22 $\frac{1}{4}$ "
40	47 $\frac{1}{4}$ "	27 $\frac{1}{4}$ "	39 $\frac{1}{4}$ "	26 $\frac{1}{4}$ "
45	51 $\frac{1}{4}$ "	31 $\frac{1}{4}$ "	43 $\frac{1}{4}$ "	30 $\frac{1}{4}$ "

PRICE: Add \$0.60 NET per Section to regular price

RADIATOR CONCEALED BRACKETS

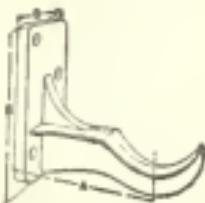
For
 Imperial Union
 Princess Union
 Royal Union
 Coronet and
 Diadem Radiators



Top Bracket

Price for Imperial, Princess and
 Royal Union, \$0.25 NET

Price for Coronet and Diadem
 \$0.12 1/2 NET

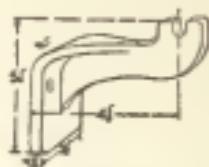


Bottom Bracket

Price for Imperial, Princess and
 Royal Union, \$0.25 NET

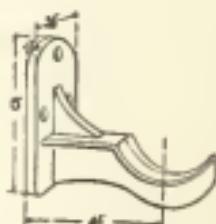
Price for Coronet and Diadem
 \$0.12 1/2 NET

For
 Scepter
 Radiators
 only



Top Bracket

Price \$0.12 1/2 NET



Bottom Bracket

Price \$0.12 1/2 NET

DIMENSIONS IN INCHES

STYLE OF BRACKET	A	B	C	D	E	H	N	K
Imperial Union, Princess Union and Royal Union	5 1/2	6 1/2	1/2	4	4	5 1/2	1/2	5 1/2
Coronet and Diadem....	3 1/2	5 1/2	1/2	3	3	4	3/8	3 1/2

RADIATOR CONCEALED BRACKETS IN POSITION



For Imperial Union, Princess
Union and Royal Union
Radiators

A=5½ inches
B=10 inches

For Coronet and Diadem
Radiators

A=3½ inches
B=6½ inches

For Scepter
Radiator

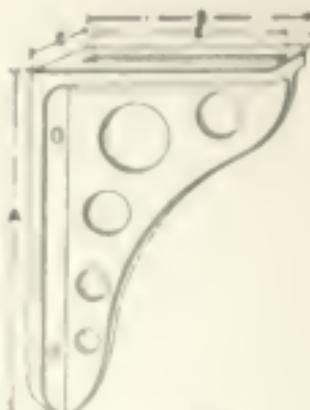
A=4½ inches
B=7½ inches

SOLID HIGH LEGS

In ordering Radiators with extra high legs, specify
the amount in inches to be added to the regular leg.

PRICE for extra high Legs: Add \$0.40 NET per
LEG Section to regular price

RADIATOR BRACKETS



WALL BRACKET

DIMENSIONS

For Imperial Union and
Princess Union Radiators

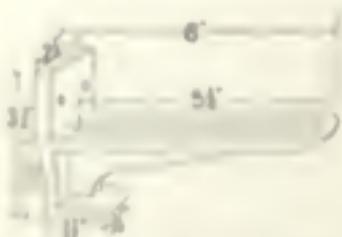
A=16 inches
B=11 inches
C=4 inches
E=9 inches

Price \$2.00

For Coronet and
Dudson Radiators

A=10 inches
B=6½ inches
C=3½ inches
E=5½ inches

Price \$1.00



BASEBOARD BRACKET

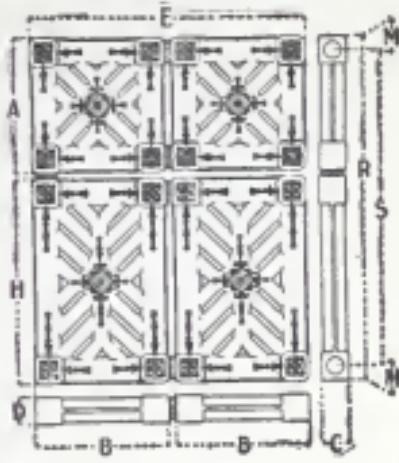
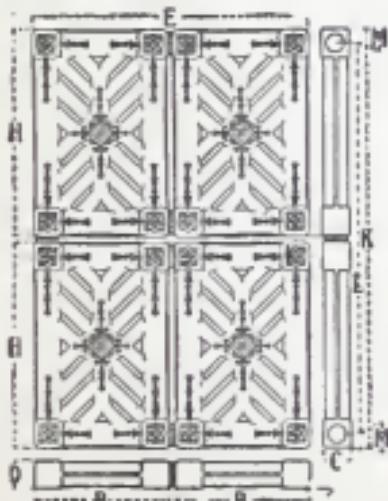
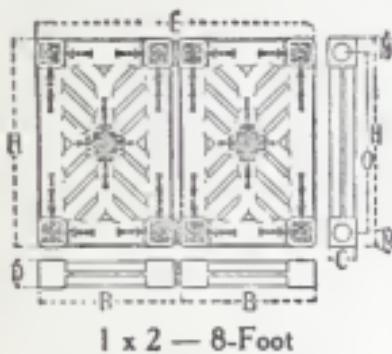
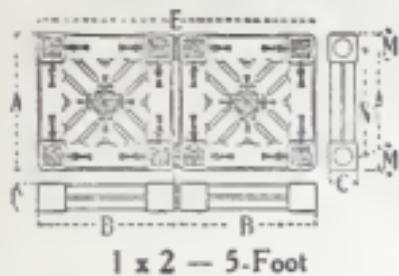
For Coronet and Dudson Radiators only

Price \$0.50

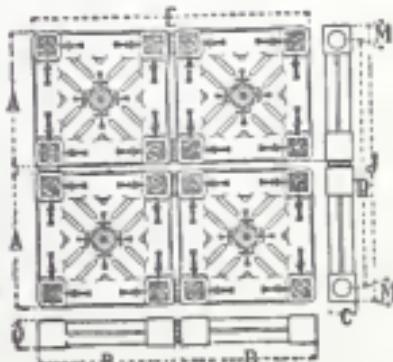
X-RAY WALL RADIATOR

STEAM OR WATER

DIMENSIONS IN INCHES



A=14 ⁵ / ₈ "	L=41 ¹ / ₂ "
B=14 ⁵ / ₈ "	M=1 ¹ / ₂ "
C=3 ¹ / ₂ "	N=11 ⁵ / ₈ "
D=3 ¹ / ₂ "	O=18 ¹ / ₂ "
E=29 ¹¹ / ₁₆ "	R=36 ¹ / ₂ "
H=21 ¹ / ₂ "	S=33 ¹ / ₂ "
J=29 ¹¹ / ₁₆ "	T=26 ¹ / ₂ "
K=44 ¹ / ₂ "	



X-RAY WALL RADIATOR

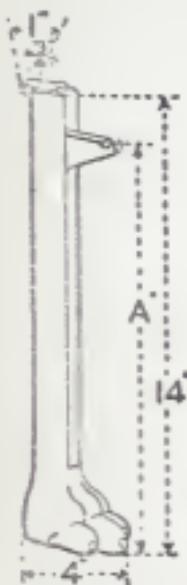
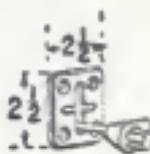
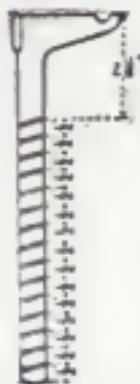
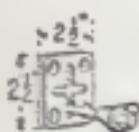
LIST OF SIZES

Number of Sections		5-FOOT X-RAY		8-FOOT X-RAY	
Height	Length	Sq. Feet of Surface	Length Feet Inches	Sq. Feet of Surface	Length Feet Inches
1 x 1		5	1— 2 $\frac{1}{4}$	8	1— 2 $\frac{1}{4}$
1 x 2		10	2— 5 $\frac{3}{4}$	16	2— 5 $\frac{3}{4}$
1 x 3		15	3— 8 $\frac{1}{4}$	24	3— 8 $\frac{1}{4}$
1 x 4		20	4— 11 $\frac{1}{2}$	32	4— 11 $\frac{1}{2}$
1 x 5		25	6— 2 $\frac{1}{4}$	40	6— 2 $\frac{1}{4}$
1 x 6		30	7— 5 $\frac{3}{4}$	48	7— 5 $\frac{3}{4}$
1 x 7		35	8— 8 $\frac{1}{4}$	56	8— 8 $\frac{1}{4}$
1 x 8		40	9— 11 $\frac{1}{4}$	64	9— 11 $\frac{1}{4}$
		Height 1 ft. 2 $\frac{5}{8}$ in.		Height 1 ft. 9 $\frac{3}{4}$ in.	
2 x 1		10	1— 2 $\frac{1}{4}$	16	1— 2 $\frac{1}{4}$
2 x 2		20	2— 5 $\frac{3}{4}$	32	2— 5 $\frac{3}{4}$
2 x 3		30	3— 8 $\frac{1}{4}$	48	3— 8 $\frac{1}{4}$
2 x 4		40	4— 11 $\frac{1}{2}$	64	4— 11 $\frac{1}{2}$
2 x 5		50	6— 2 $\frac{1}{4}$	80	6— 2 $\frac{1}{4}$
2 x 6		60	7— 5 $\frac{3}{4}$	96	7— 5 $\frac{3}{4}$
2 x 7		70	8— 8 $\frac{1}{4}$	112	8— 8 $\frac{1}{4}$
2 x 8		80	9— 11 $\frac{1}{4}$	128	9— 11 $\frac{1}{4}$
		Height 2 ft. 5 $\frac{3}{4}$ in.		Height 3 ft. 8 $\frac{1}{4}$ in.	
3 x 1		15	1— 2 $\frac{1}{4}$	24	1— 2 $\frac{1}{4}$
3 x 2		30	2— 5 $\frac{3}{4}$	48	2— 5 $\frac{3}{4}$
3 x 3		45	3— 8 $\frac{1}{4}$	72	3— 8 $\frac{1}{4}$
3 x 4		60	4— 11 $\frac{1}{2}$	96	4— 11 $\frac{1}{2}$
3 x 5		75	6— 2 $\frac{1}{4}$	120	6— 2 $\frac{1}{4}$
3 x 6		90	7— 5 $\frac{3}{4}$	144	7— 5 $\frac{3}{4}$
3 x 7		105	8— 8 $\frac{1}{4}$	168	8— 8 $\frac{1}{4}$
3 x 8		120	9— 11 $\frac{1}{4}$	192	9— 11 $\frac{1}{4}$
		Height 3 ft. 8 $\frac{7}{8}$ in.		Height 5 ft. 6 $\frac{3}{4}$ in.	

8-FOOT SECTION Radiators, longer than one section are NOT tapped to be used HORIZONTALLY.

PRICE: 5-foot and 8-foot X-Ray
\$0.42 per square foot

X-RAY WALL RADIATOR LEGS AND BRACKETS

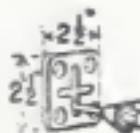
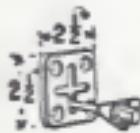


REDUCIBLE BRACKET

Used with No. 1 and
No. 2 X-Ray Bracket

A = 12 1/2 inches

but can be reduced to 5
inches by cutting off the
Reducible Bracket



No. 1

Price \$0.60
Complete

No. 2

Price \$0.55
Complete



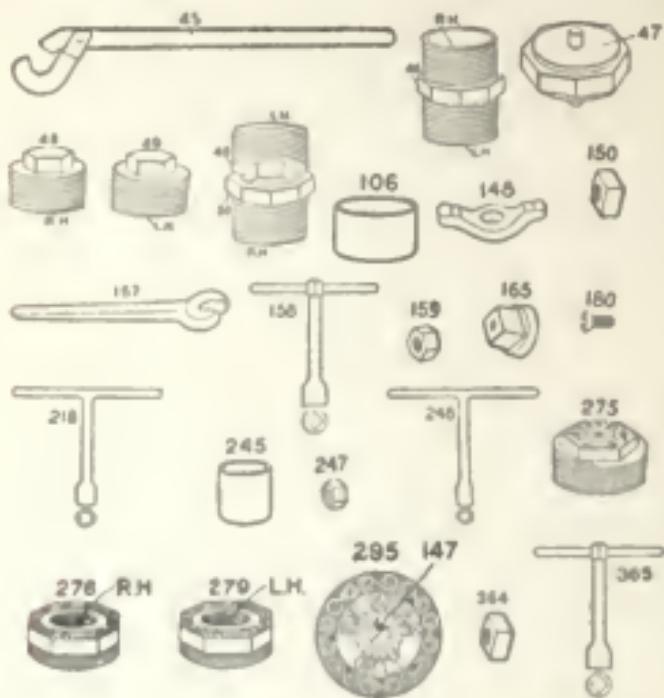
No. 3

Price \$0.20
Complete

No. 4

Price \$0.20
Complete

DIRECT RADIATOR FITTINGS



PRICE LIST

No.	Name	Size	NET Price	No.	Name	Size	NET Price
45 X	Ray Wrench		\$3.00	180	Imperial		
46 R. and L.					Rosette Screw		\$.00
	Nipple	1 1/8"	.10	218	Wrench for Nut		
47	Disk		.05		No. 159	1" Hex.	1.25
48	R. H. Male Plug	1 1/8"	.05	245	Sovereign Top		
49	L. H. Male Plug	1 1/8"	.05		Nipple		.02
50	R. H. Female			247	Sovereign Nut	5/8" Hex.	.00
	Plug	1 1/8"	.05	248	Wrench for Nut		
	Push Nipple		.02		No. 247	5/8" Hex.	.75
148	Yoke		.02	275	Radiator Plug	2"	.05
149	Nut	7/8" Sq.	.00	276	Radiator		
150	Wrench for Nut				Bushing R. H.	2"	.05
	No. 159	1" Hex.		279	Radiator		
151	Wrench for Nut				Bushing L. H.	2"	.05
	No. 159	1" Hex.		295	Royal Rosette		.02
152	Nut	7/8" Sq.	1.25	364	Nut	1" Sq.	.00
153	Royal Steam				Wrench for Nut		
	Nut	1" Sq.	.02		No. 364	1" Sq.	1.25

*Catalog number of part.

DIRECT RADIATORS—REGULAR TAPPING

STEAM

TWO-PIPE WORK

Radiators will be tapped for two-pipe work unless otherwise specified.

Radiators of 50 square feet and smaller	1" x $\frac{3}{4}$ "
Radiators larger than 50 square feet.....	$1\frac{1}{4}$ " x 1"
Air Valve.....	$\frac{1}{8}$ "

ONE-PIPE WORK

Radiators of 30 square feet and smaller	1"
Radiators larger than 30 square feet and smaller than 60 square feet.....	$1\frac{1}{4}$ "
Radiators larger than 60 square feet.....	$1\frac{1}{2}$ "
Air Valve .. .	$\frac{1}{8}$ "

WATER

Radiators of 50 square feet and smaller.....	1" x 1"
Radiators larger than 50 square feet.....	$1\frac{1}{4}$ " x $1\frac{1}{4}$ "
Air Valve.....	$\frac{1}{8}$ " at top

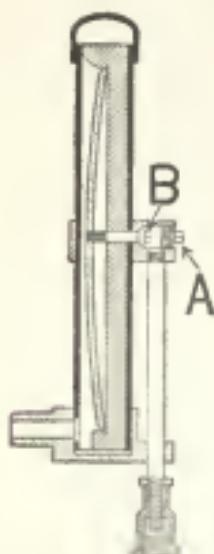
If radiators are required tapped top and bottom, same end, or top and bottom, opposite ends, so specify on order.

All tappings will be made RIGHT HAND unless otherwise specified.



BRECKENRIDGE'S
AUTOMATIC
AIR
VALVES

AUTOMATIC AIR VALVES



Sectional View

The cut opposite illustrates a sectional view of the No. 4 Valve, but also shows the Mechanical Construction of all Breckenridge Automatic Air Valves.

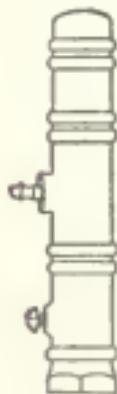
TO SET VALVE

Remove the plug and unscrew the valve so that the steam will flow out freely. After the valve has become thoroughly heated close it lightly until the flow of steam stops (do not close the valve too hard on its seat), then screw in the plug and the valve will require no further attention.

These directions apply to all of the valves except No. 1, which is to be set with thumb screw instead of with key.

Keys are furnished with valves.

FOR INDIRECT RADIATORS



No. 1 Valve

Cast Iron—Finished Black
1/2" Connection

Price \$0.70



No. 2 Valve

Cast Iron—Finished Black
1/2" Connection, 1/2" Drip

Price \$0.80

AUTOMATIC AIR VALVES

FOR DIRECT RADIATORS



No. 3 Valve

Brass—Nickel Plated
1/2" Connection

Price \$1.00



No. 4 Valve

Brass—Nickel Plated
1/2" Connection 1/2" Drip

Price \$1.25



No. 5 Valve

Brass—Nickel Plated
1/2" Connection

Price \$1.25



No. 6 Valve

Brass—Nickel Plated
1/2" Connection 1/2" Drip

Price \$1.25

AUTOMATIC AIR VALVES

FOR DIRECT RADIATORS



No. 7 Valve

Brass—Nickel Plated
1/2" Connection

Price \$1.25



No. 8 Valve

Brass—Nickel Plated
1/2" Connection 1/2" Drip

Price \$1.50



No. 9 Valve

Brass—Nickel Plated
1/2" Connection

Price \$1.50



No. 6 Elbow

Brass—Nickel Plated
Used with No. 6 Valve

Price \$0.25



No. 7 Elbow

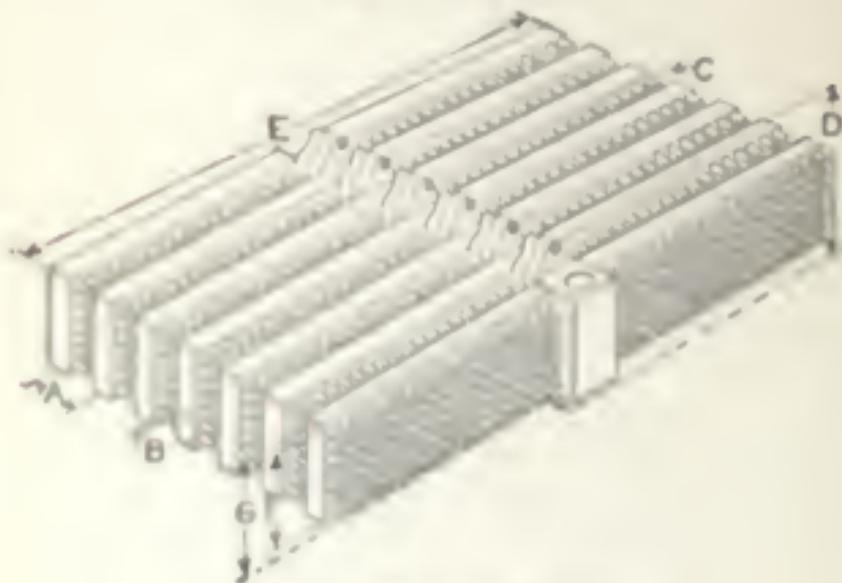
Brass—Nickel Plated
Used with No. 7 Valve

Price \$0.25

INDIRECT RADIATORS

REGULAR PATTERN GOLD PIN

STEAM OR WATER



10 Square Feet per Section

DIMENSIONS OF SECTION

A	Dimension from center to center of tubes	3 1/4"
B	Dimension from center of tube to face of flange	3 1/2"
C	Length of tube	36"
D	Height of flange	10 1/4"
E	Length of section of coil	40 1/2"
F	Height of section of coil	6"
G	Height of section of center	7 1/2"

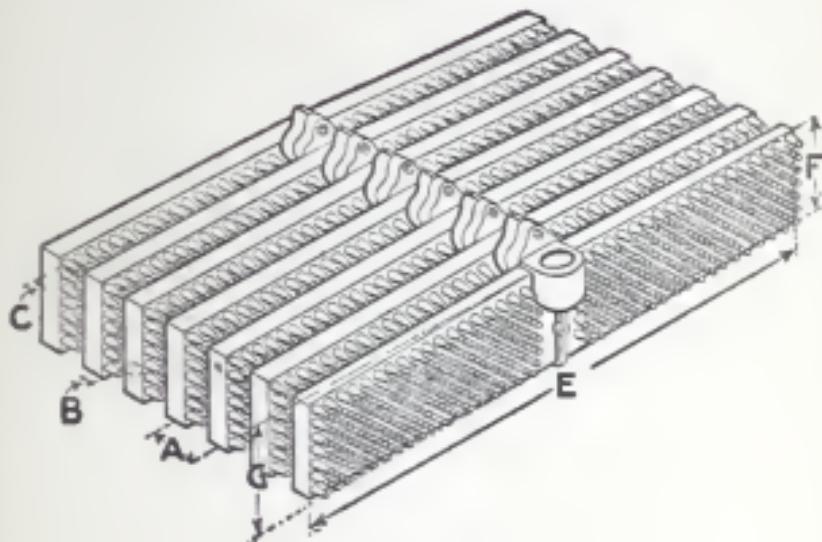
Shipping weight, per section, 70 lbs.

REGULAR TAPPING

Supply	1 1/2"	Return	1 1/2"
Air Valve	1 1/2"		

Price \$0.27 per Square Foot

TEN-INCH FLANGE
GOLD PIN
STEAM OR WATER



15 Square Feet per Section

DIMENSIONS OF SECTION

A	Distance from center to center.....	$3\frac{1}{4}$ "
B	Distance between ends of Pins.....	$\frac{1}{4}$ "
C	Length of Pin.....	$\frac{3}{4}$ "
E	Length of Section.....	$40\frac{1}{2}$ "
F	Height of Section at end.....	$10\frac{1}{4}$ "
G	Height of Section at center.....	$10\frac{1}{4}$ "

Shipping weight, per Section, 108 lbs.

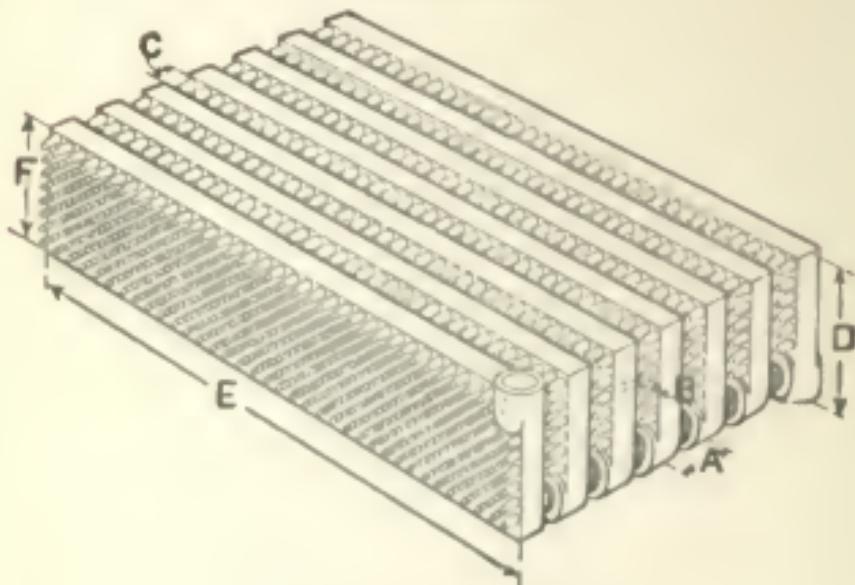
REGULAR TAPPING

Supply.....	$1\frac{1}{2}$ "	Return.....	$1\frac{1}{2}$ "
Air Valve.....	$\frac{3}{8}$ "		

Price \$0.27 per Square Foot

12-FOOT R. & L. NIPPLE GOLD PIN

STEAM ONLY



12 Square Feet per Section

DIMENSIONS OF SECTION

A	Distance from center to center	$3\frac{1}{4}''$
B	Distance between ends of Pins	$\frac{1}{4}''$
C	Length of Pin	$\frac{3}{4}''$
D	Height of Section	$\frac{9}{16}''$
E	Length of Section	$36''$
F	Height of Section	$8\frac{1}{4}''$
	Size of Right and Left Nipple	$2''$

Shipping weight, per Section, 62 lbs.

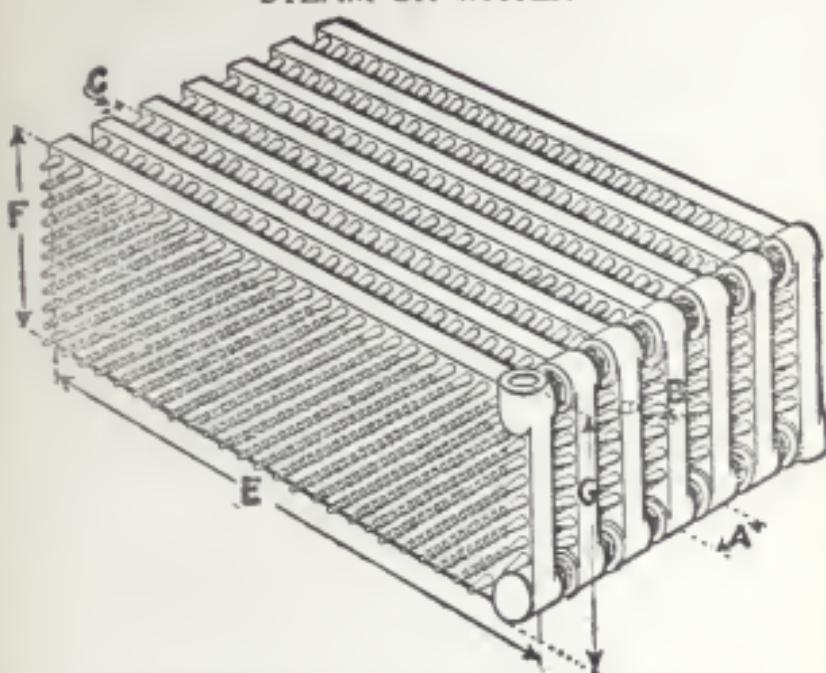
Supply or Head Section is tapped L. H. for R. & L. Nipple
Return or Drain section is tapped R. H. for R. & L. Nipple

REGULAR TAPPING

Supply	$1\frac{1}{4}''$ Air Valve	Return $\frac{3}{4}''$	$1\frac{1}{4}''$
--------	-------------------------------	---------------------------	------------------

Price \$0.27 per Square Foot

RIGHT AND LEFT NIPPLE
GOLD PIN
STEAM OR WATER



15-FOOT R. & L. NIPPLE GOLD PIN

F	Height of Section.....	10"
G	Height of Section.....	11½"
	Shipping weight, per Section, 77 lbs.	
	15 Square Feet per Section	

20-FOOT R. & L. NIPPLE GOLD PIN

F	Height of Section.....	14"
G	Height of Section.....	15½"
	Shipping weight, per Section, 106 lbs.	
	20 Square Feet per Section	

DIMENSIONS COMMON TO BOTH

A	Distance from center to center.....	3¼"
B	Distance between ends of Pins.....	¾"
C	Length of Pin.....	¾"
E	Length of Section.....	36"
	Size of R. & L. Nipple.....	2"

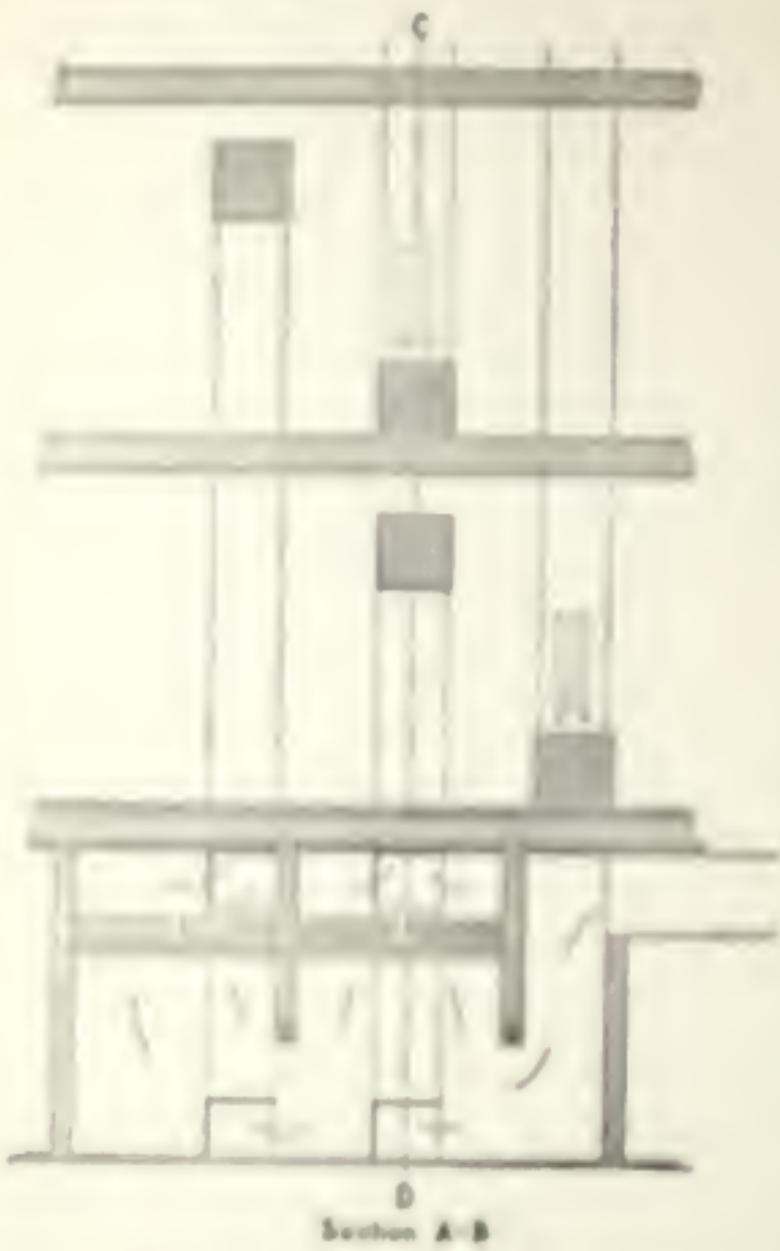
REGULAR TAPPING

Supply.....	1½"	Return.....	1½"
	Air Valves.....	¾"	

Supply or Head Section is tapped L. H. for R. & L. Nipple
Return or Drain Section is tapped R. H. for R. & L. Nipple

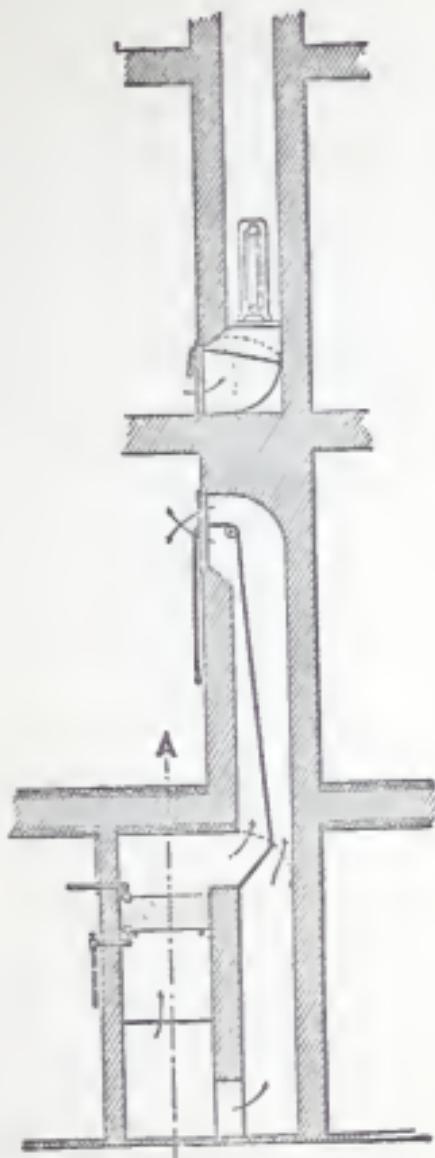
Price \$0.27 per Square Foot

SCHOOL PIN



As used for warming and ventilating schoolhouses

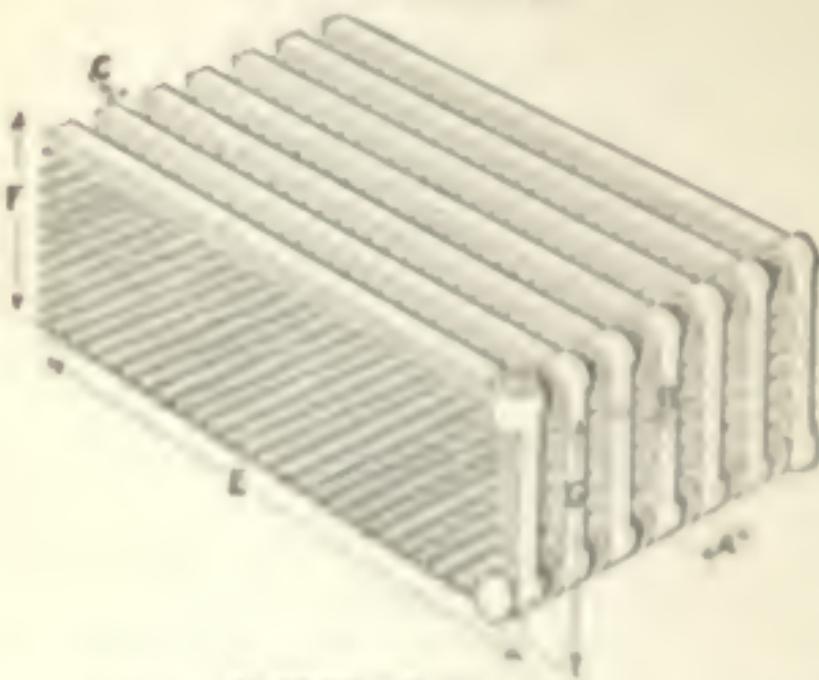
SCHOOL PIN



As used for warming and ventilating schoolhouses

SCHOOL PIN

STEAM OR WATER



10 FOOT SCHOOLS PIN

F	Height of fins	100
G	Height of fins	100
	Surface, square per Square Foot	100
	Surface Foot per Square Foot	100

10 FOOT SCHOOLS PIN

F	Height of fins	100
G	Height of fins	100
	Surface, square per Square Foot	100
	Surface Foot per Square Foot	100

LIME WASHING APPARATUS TO RADIATOR

A	Washout Foot, and apparatus	100
B	Washout Foot, and apparatus	100
C	Washout Foot, and apparatus	100
D	Washout Foot, and apparatus	100
	Size of B & L. Wagon	100

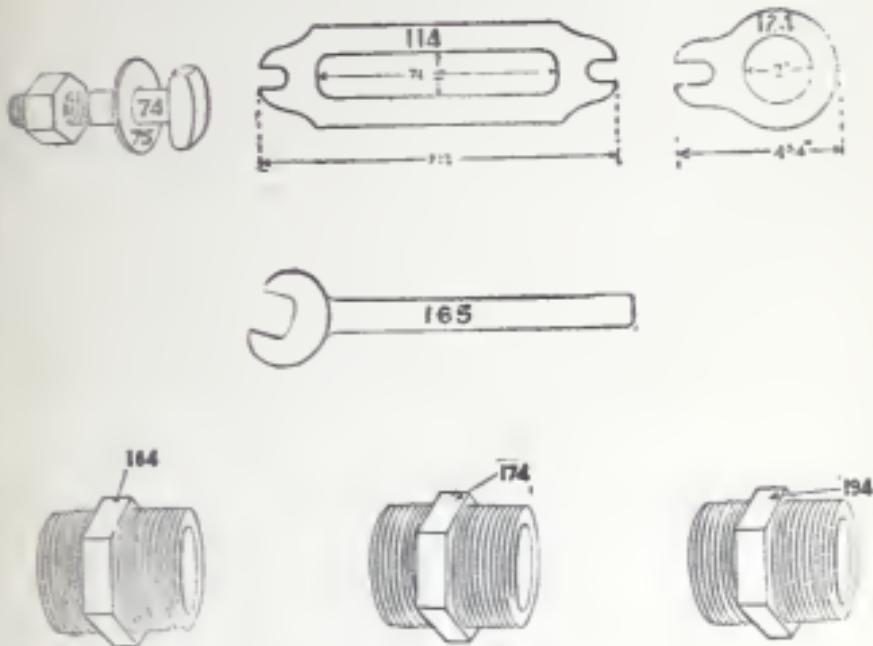
REGULAR TAPPING

Size	Size	Size
	Air Valve	100

Size of Air Valve or size of 100 of 100

Price \$0.27 per Square Foot

INDIRECT RADIATOR FITTINGS



PRICE LIST

No.*	Name	Size	NET Price
74	Bolt with Nut.....		\$.02 ½
75	Washer for Bolt No. 74.....		.00 ½
114	Regular Pattern (paper) Gasket.....		.01
124	10" Flange Pin (paper) Gasket.....		.01
164	R. & L. Nipple for 12-foot Gold Pin.....	2" Hex.	.15
165	Wrench for Nipple No. 164.....	2" Hex.	1.25
174	R. & L. Nipple for School Pin.....	2" Hex.	.15
194	R. & L. Nipple for 15 & 20-foot Gold Pin	2" Hex.	.15

*Catalog number of part.



RULES
AND
PRACTICAL
DATA

TABLE OF NET PRICES

Figured at Different Discounts for the Several Heights of Radiators

Discount	45° and 44°		38° and 37°		31° and 30°		25° and 24°		19°	
	41c	42c	46c	50c	53c	56c	60c	63c	67c	
13	\$ 305	\$ 315	\$ 345	\$ 355	\$ 375	\$ 405	\$ 435	\$ 455	\$ 475	
20	2034	2138	2444	2547	2650	2853	3056	3159	3262	
27	2093	2196	2500	2603	2705	2808	3011	3114	3217	
34	2112	2114	2414	2516	2618	2820	3022	3124	3226	
41	2111	2112	2410	2511	2612	2813	3014	3115	3216	
5	287	294	322	332	342	362	382	392	402	
11	1810	1818	2114	2215	2316	2518	2719	2819	2919	
18	1798	1806	2110	2211	2312	2514	2715	2815	2915	
25	1747	1854	2052	2153	2254	2452	2653	2754	2854	
32	1746	1772	2048	2149	2248	2446	2647	2748	2848	
39	1761	1788	2064	2165	2266	2464	2665	2766	2866	
46	1714	1808	2014	2114	2214	2414	2614	2714	2814	
53	1703	1740	2003	2103	2203	2403	2603	2703	2803	
60	1742	1814	2032	2132	2232	2432	2632	2732	2832	
67	1701	1752	2000	2100	2200	2400	2600	2700	2800	
74	1740	1771	2030	2130	2230	2430	2630	2730	2830	
81	1739	1770	2029	2129	2229	2429	2629	2729	2829	
88	1738	1769	2028	2128	2228	2428	2628	2728	2828	
95	1737	1768	2027	2127	2227	2427	2627	2727	2827	
102	1736	1767	2026	2126	2226	2426	2626	2726	2826	
109	1735	1766	2025	2125	2225	2425	2625	2725	2825	
116	1734	1765	2024	2124	2224	2424	2624	2724	2824	
123	1733	1764	2023	2123	2223	2423	2623	2723	2823	
130	1732	1763	2022	2122	2222	2422	2622	2722	2822	
137	1731	1762	2021	2121	2221	2421	2621	2721	2821	
144	1730	1761	2020	2120	2220	2420	2620	2720	2820	
151	1729	1760	2019	2119	2219	2419	2619	2719	2819	
158	1728	1759	2018	2118	2218	2418	2618	2718	2818	
165	1727	1758	2017	2117	2217	2417	2617	2717	2817	
172	1726	1757	2016	2116	2216	2416	2616	2716	2816	
179	1725	1756	2015	2115	2215	2415	2615	2715	2815	
186	1724	1755	2014	2114	2214	2414	2614	2714	2814	
193	1723	1754	2013	2113	2213	2413	2613	2713	2813	
200	1722	1753	2012	2112	2212	2412	2612	2712	2812	
207	1721	1752	2011	2111	2211	2411	2611	2711	2811	
214	1720	1751	2010	2110	2210	2410	2610	2710	2810	
221	1719	1750	2009	2109	2209	2409	2609	2709	2809	
228	1718	1749	2008	2108	2208	2408	2608	2708	2808	
235	1717	1748	2007	2107	2207	2407	2607	2707	2807	
242	1716	1747	2006	2106	2206	2406	2606	2706	2806	
249	1715	1746	2005	2105	2205	2405	2605	2705	2805	
256	1714	1745	2004	2104	2204	2404	2604	2704	2804	
263	1713	1744	2003	2103	2203	2403	2603	2703	2803	
270	1712	1743	2002	2102	2202	2402	2602	2702	2802	
277	1711	1742	2001	2101	2201	2401	2601	2701	2801	
284	1710	1741	2000	2100	2200	2400	2600	2700	2800	
291	1709	1740	1999	2098	2197	2396	2595	2794	2893	
298	1708	1739	1998	2097	2196	2395	2594	2793	2892	
305	1707	1738	1997	2096	2195	2394	2593	2792	2891	
312	1706	1737	1996	2095	2194	2393	2592	2791	2890	
319	1705	1736	1995	2094	2193	2392	2591	2790	2889	
326	1704	1735	1994	2093	2192	2391	2590	2789	2888	
333	1703	1734	1993	2092	2191	2390	2589	2788	2887	
340	1702	1733	1992	2091	2190	2389	2588	2787	2886	
347	1701	1732	1991	2090	2189	2388	2587	2786	2885	
354	1700	1731	1990	2089	2188	2387	2586	2785	2884	
361	1699	1730	1989	2088	2187	2386	2585	2784	2883	
368	1698	1729	1988	2087	2186	2385	2584	2783	2882	
375	1697	1728	1987	2086	2185	2384	2583	2782	2881	
382	1696	1727	1986	2085	2184	2383	2582	2781	2880	
389	1695	1726	1985	2084	2183	2382	2581	2780	2879	
396	1694	1725	1984	2083	2182	2381	2580	2779	2878	
403	1693	1724	1983	2082	2181	2380	2579	2778	2877	
410	1692	1723	1982	2081	2180	2379	2578	2777	2876	
417	1691	1722	1981	2080	2179	2378	2577	2776	2875	
424	1690	1721	1980	2079	2178	2377	2576	2775	2874	
431	1689	1720	1979	2078	2177	2376	2575	2774	2873	
438	1688	1719	1978	2077	2176	2375	2574	2773	2872	
445	1687	1718	1977	2076	2175	2374	2573	2772	2871	
452	1686	1717	1976	2075	2174	2373	2572	2771	2870	
459	1685	1716	1975	2074	2173	2372	2571	2770	2869	
466	1684	1715	1974	2073	2172	2371	2570	2769	2868	
473	1683	1714	1973	2072	2171	2370	2569	2768	2867	
480	1682	1713	1972	2071	2170	2369	2568	2767	2866	
487	1681	1712	1971	2070	2169	2368	2567	2766	2865	
494	1680	1711	1970	2069	2168	2367	2566	2765	2864	
501	1679	1710	1969	2068	2167	2366	2565	2764	2863	
508	1678	1709	1968	2067	2166	2365	2564	2763	2862	
515	1677	1708	1967	2066	2165	2364	2563	2762	2861	
522	1676	1707	1966	2065	2164	2363	2562	2761	2860	
529	1675	1706	1965	2064	2163	2362	2561	2760	2859	
536	1674	1705	1964	2063	2162	2361	2560	2759	2858	
543	1673	1704	1963	2062	2161	2360	2559	2758	2857	
550	1672	1703	1962	2061	2160	2359	2558	2757	2856	
557	1671	1702	1961	2060	2159	2358	2557	2756	2855	
564	1670	1701	1960	2059	2158	2357	2556	2755	2854	
571	1669	1700	1959	2058	2157	2356	2555	2754	2853	
578	1668	1699	1958	2057	2156	2355	2554	2753	2852	
585	1667	1698	1957	2056	2155	2354	2553	2752	2851	
592	1666	1697	1956	2055	2154	2353	2552	2751	2850	
599	1665	1696	1955	2054	2153	2352	2551	2750	2849	
606	1664	1695	1954	2053	2152	2351	2550	2749	2848	
613	1663	1694	1953	2052	2151	2350	2549	2748	2847	
620	1662	1693	1952	2051	2150	2349	2548	2747	2846	
627	1661	1692	1951	2050	2149	2348	2547	2746	2845	
634	1660	1691	1950	2049	2148	2347	2546	2745	2844	
641	1659	1690	1949	2048	2147	2346	2545	2744	2843	
648	1658	1689	1948	2047	2146	2345	2544	2743	2842	
655	1657	1688	1947	2046	2145	2344	2543	2742	2841	
662	1656	1687	1946	2045	2144	2343	2542	2741	2840	
669	1655	1686	1945	2044	2143	2342	2541	2740	2839	
676	1654	1685	1944	2043	2142	2341	2540	2739	2838	
683	1653	1684	1943	2042	2141	2340	2539	2738	2837	
690	1652	1683	1942	2041	2140	2339	2538	2737	2836	
697	1651	1682	1941	2040	2139	2338	2537	2736	2835	
704	1650	1681	1940	2039	2138	2337	2536	2735	2834	
711	1649	1680	1939	2038	2137	2336	2535	2734	2833	
718	1648	1679	1938	2037	2136	2335	2534	2733	2832	
725	1647	1678	1937	2036	2135	2334	2533	2732	2831	
732	1646	1677	1936	2035	2134	2333	2532	2731	2830	
739	1645	1676	1935	2034	2133	2332	2531	2730	2829	
746	1644	1675	1934	2033	2132	2331	2530	2729	2828	
753	1643	1674	1933	2032	2131	2330	2529	2728	2827	
760	1642	1673	1932	2031	2130	2329	2528	2727	2826	
767	1641	1672	1931	2030	2129	2328	2527	2726	2825	
774	1640	1671	1930	2029	2128	2327	2526	2725	2824	
781	1639	1670	1929	2028	2127	2326	2525	2724	2823	
788	1638	1669	1928	2027	2126	2325	2524	2723	2822	
795	1637	1668	1927	2026	2125	2324	2523	2722	2821	
802	1636	1667	1926	2025	2124	2323	2522			

TABLE OF NET PRICES

Figured at Different Discounts for the Several Heights of Radiators

Discount	18"	16"	14"	12"	Indirects
	58c	60c	64c	68c	27c
25	\$.435	\$.45	\$.48	\$.51	\$.2025
26	.4292	.444	.4736	.5032	.1998
27	.4234	.438	.4672	.4964	.1971
28	.4176	.432	.4608	.4896	.1944
29	.4118	.426	.4544	.4828	.1917
30	.406	.42	.448	.476	.189
31	.4002	.414	.4416	.4692	.1863
32	.3944	.408	.4352	.4624	.1836
33	.3886	.402	.4288	.4556	.1809
34	.3828	.396	.4224	.4488	.1782
35	.377	.39	.416	.442	.1755
36	.3712	.384	.4096	.4352	.1728
37	.3654	.378	.4032	.4284	.1701
38	.3596	.372	.3968	.4216	.1674
39	.3538	.366	.3904	.4148	.1647
40	.348	.36	.384	.408	.162
41	.3422	.354	.3776	.4012	.1593
42	.3364	.348	.3712	.3944	.1566
43	.3306	.342	.3648	.3876	.1539
44	.3248	.336	.3584	.3808	.1512
45	.319	.33	.352	.374	.1485
46	.3132	.324	.3456	.3672	.1458
47	.3074	.318	.3392	.3604	.1431
48	.3016	.312	.3328	.3536	.1404
49	.2958	.306	.3264	.3468	.1377
50	.29	.30	.32	.34	.135
51	.2842	.294	.3136	.3332	.1323
52	.2784	.288	.3072	.3264	.1296
53	.2726	.282	.3008	.3196	.1269
54	.2668	.276	.2944	.3128	.1242
55	.261	.27	.288	.306	.1215
56	.2552	.264	.2816	.2992	.1188
57	.2494	.258	.2752	.2924	.1161
58	.2436	.252	.2688	.2856	.1134
59	.2378	.246	.2624	.2788	.1107
60	.232	.24	.256	.272	.108
61	.2262	.234	.2496	.2652	.1053
62	.2204	.228	.2432	.2584	.1026
63	.2146	.222	.2368	.2516	.0999
64	.2088	.216	.2304	.2448	.0972
65	.203	.21	.224	.238	.0945
66	.1972	.204	.2176	.2312	.0918
67	.1914	.198	.2112	.2244	.0891
68	.1856	.192	.2048	.2176	.0864
69	.1798	.186	.1984	.2108	.0837
70	.174	.18	.192	.204	.081
71	.1682	.174	.1856	.1972	.0783
72	.1624	.168	.1792	.1904	.0756
73	.1566	.162	.1728	.1836	.0729
74	.1508	.156	.1664	.1768	.0702
75	.145	.15	.16	.17	.0675

WEIGHTS AND MEASURES

MEASURE OF LENGTH

4	in	make	1 Hand	3	Feet	make	1 Yard
12	in	"	1 Link	5 1/4	Yds	"	1 Rod or Pole
3	in	"	1 Chain	40	Feet	"	1 Furlong
5280	ft	"	1 Mile	8	Feet	"	1 Mile
1	ft	"	1 Fathom	634	Miles	"	1 League
1 Degree contains 60 Geographical Miles.							
From Yards				1 Min.			
1000 Feet				1 Min.			

MEASURE OF SURFACE

4	square Yards	make	1 Square Rod
36	square Feet	"	16 square Yards
4840	square Yards	"	1/16th of an Acre
40	square Rods	"	1 Rod
4	Acres	"	1 Acre
16	square Rods	"	1 Acre
4840	Acres	"	1 Square Mile
640	Acres	make	1 Section (640 Acres)
640	Acres	make	1 Square Mile
43,560	Square Rods	make	1 Acre

MEASURE OF SOLIDITY

16	cubic Yards	make	1 Cubic Foot
1	Cubic Foot	"	1 Cubic Yd.

AVOIRDUPOIS WEIGHT

16	ounces	make	1 pound
16	pounds	make	1 stone
16	stones	make	1 cwt.
16	cwts.	make	1 ton
16	ton	"	16 cwts.

LIQUID MEASURE

4	gills	make	1 pint
2	pints	make	1 quart
4	quarts	make	1 peck

DRY MEASURE

4	quarts	make	1 peck
4	pecks	make	1 bushel
4	bushels	make	1 peck

METRIC SYSTEM

MEASURES OF LENGTH

METRIC DENOMINATIONS.		EQUIVALENTS.
Meter.	10,000 Meters.	6.2137 miles.
Kilometer.	1,000 "	0.62137
Hectometer.	100 "	328.092 feet.
Dekameter.	10 "	32.809
Meter.	1 "	3.2809
Decimeter.	1-10 "	3.2809
Centimeter.	1-100 "	0.3937
Millimeter.	1-1000 "	0.03937

MEASURES OF SURFACE

METRIC DENOMINATIONS.		EQUIVALENTS.
Hectare.	10,000 Square Meters.	2.471 Acres.
Acre.	100 "	119.6 Square Yards.
Centare.	1 "	10.7643 Square Feet.

MEASURES OF CAPACITY

METRIC DENOMINATIONS.		EQUIVALENTS.	DRY MEASURE.	WINE MEASURE.
Kiloliter.	1,000 Liters.	1.308 Cubic Yards.	264.17	Gallons
Hectoliter.	100 "	2 Bn. and 3.33 Pecks.	26.417	
Dekaliter.	10 "	3.18 Quarts.	2.6417	
Liter.	1 "	0.908		1.056 Quarts.
Deciliter.	1-10 "	6.1022 Cubic Inches.	0.945	G.
Centiliter.	1-100 "	0.61022	1.35	Fluid Oz.
Milliliter.	1-1000 "	.061	.17	Ltr.

WEIGHTS

METRIC DENOMINATIONS.		EQUIVALENTS		
		AVOCADOPOLE WT.	QUANTITY OF WATER	
Millier.	1,000,000 Grams.	2204.6	Lbs.	1 Cubic Meter.
Cental.	100,000 "	220.46	"	1 Hectoliter.
Myriagram.	10,000 "	22.046	"	1 Dekaliter.
Kilogram.	1,000 "	2.2046	"	1 Liter.
Hectogram.	100 "	.35174	Oz.	1 Dekiliter.
Dekagram.	10 "	.035174	"	1 Centiliter.
Gram.	1 "	15.432	Gr.	1 Milliliter.
Decagram.	1-10 "	1.5432	"	1
Centagram.	1-100 "	.1543	"	.01
Milligram.	1-1000 "	.0154	"	.001

AREAS AND CIRCUMFERENCES
 OF CIRCLES

Diam.	Circum.	Area	Diam.	Circum.	Area
.14	.7854	.04909	19.	59.6904	283.529
.14	1.5708	.19635	34	61.2612	298.648
.14	2.3562	.44178	20.	62.832	314.16
1.	3.1416	.7854	34	64.4028	330.064
1.	4.7124	1.7671	21	65.9736	346.361
2	6.2832	3.1416	34	67.5444	363.051
2	7.854	4.9087	22	69.1152	380.134
3.	9.4248	7.0686	34	70.686	397.608
3.	10.9956	9.6211	23.	72.2568	415.477
4	12.5664	12.5664	34	73.8276	433.731
4	14.1372	15.9043	24	75.3984	452.39
5	15.708	19.635	34	76.9692	471.436
5	17.2788	23.7583	25	78.54	490.875
6.	18.8496	28.2744	34	80.1108	510.706
6.	20.4204	33.1831	26	81.6816	530.93
7	21.9912	38.4846	34	83.2524	551.547
7	23.562	44.1787	27	84.8232	572.557
8	25.1328	50.2656	34	86.394	593.958
8	26.7036	56.7451	28	87.9648	615.754
9	28.2744	63.6174	34	89.5356	637.941
9	29.8452	70.8823	29	91.1064	660.521
10	31.416	78.54	34	92.6772	683.494
10	32.9868	86.59	30	94.248	706.86
11	34.5576	95.0334	34	95.8188	736.618
11	36.1284	103.8691	31	97.3896	754.79
12	37.6992	113.098	34	98.9604	779.313
12	39.27	122.718	32	100.5312	804.25
13	40.8408	132.733	34	102.102	829.578
13	42.4116	143.139	33	103.673	847.888
14	43.9824	153.938	34	105.244	861.415
14	45.5532	165.13	34	106.814	877.922
15	47.124	176.715	34	108.385	894.822
15	48.6948	188.692	35	109.956	912.115
16	50.2656	200.062	34	111.527	939.8
16	51.8364	213.825	36	113.098	957.878
17	53.4072	226.981	34	114.668	975.349
17	54.978	240.528	37	116.239	995.213
18	56.5488	254.467	34	117.81	1014.469
18	58.1196	268.803	38	119.381	1034.118

AREAS AND CIRCUMFERENCES
 OF CIRCLES

Diam.	Circum.	Area	Diam.	Circum.	Area
38. $\frac{1}{2}$	120.952	1164.159	57.	179.071	2551.76
39.	122.522	1194.593	$\frac{1}{2}$	180.642	2596.73
$\frac{1}{2}$	124.093	1225.42	58.	182.213	2642.09
40.	125.664	1256.64	$\frac{1}{2}$	183.784	2687.84
$\frac{1}{2}$	127.235	1288.25	59.	185.354	2733.98
41.	128.806	1320.26	$\frac{1}{2}$	186.925	2780.51
$\frac{1}{2}$	130.376	1352.65	60.	188.496	2827.44
42.	131.947	1385.44	$\frac{1}{2}$	190.067	2874.76
$\frac{1}{2}$	133.518	1418.63	61.	191.638	2922.47
43.	135.089	1452.21	$\frac{1}{2}$	193.208	2970.58
$\frac{1}{2}$	136.66	1486.17	62.	194.779	3019.08
44.	138.23	1520.53	$\frac{1}{2}$	196.35	3067.97
$\frac{1}{2}$	139.801	1555.28	63.	197.921	3117.25
45.	141.372	1590.43	$\frac{1}{2}$	199.492	3166.93
$\frac{1}{2}$	142.943	1625.97	64.	201.062	3217.
46.	144.514	1661.91	$\frac{1}{2}$	202.633	3267.46
$\frac{1}{2}$	146.084	1698.23	65.	204.204	3318.31
47.	147.655	1734.95	$\frac{1}{2}$	205.775	3369.56
$\frac{1}{2}$	149.226	1772.05	66.	207.346	3421.2
48.	150.797	1809.56	$\frac{1}{2}$	208.916	3473.24
$\frac{1}{2}$	152.368	1847.45	67.	210.487	3525.66
49.	153.938	1885.74	$\frac{1}{2}$	212.058	3578.48
$\frac{1}{2}$	155.509	1924.42	68.	213.629	3631.69
50.	157.08	1963.5	$\frac{1}{2}$	215.2	3685.29
$\frac{1}{2}$	158.651	2002.97	69.	216.77	3739.29
51.	160.222	2042.82	$\frac{1}{2}$	218.341	3793.68
$\frac{1}{2}$	161.792	2083.08	70.	219.912	3848.46
52.	163.363	2123.72	$\frac{1}{2}$	221.483	3903.63
$\frac{1}{2}$	164.934	2164.76	71.	223.054	3959.2
53.	166.505	2206.19	$\frac{1}{2}$	224.624	4015.16
$\frac{1}{2}$	168.076	2248.01	72.	226.195	4071.51
54.	169.646	2290.23	$\frac{1}{2}$	227.766	4128.26
$\frac{1}{2}$	171.217	2332.83	73.	229.337	4185.4
55.	172.788	2375.83	$\frac{1}{2}$	230.908	4242.93
$\frac{1}{2}$	174.359	2419.22	74.	232.478	4300.85
56.	175.93	2463.01	$\frac{1}{2}$	234.049	4359.17
$\frac{1}{2}$	177.5	2507.19	75.	235.62	4417.87

RELATIVE PROPORTIONS OF A WARMING APPARATUS

Sq. Feet of Heating Surface	Sq. Feet of Grate Surface	Size of Flue, Square Inches	Sq. Feet of Radia- tion	SURFACE TO CONTENTS		
				1:50	1:70	1:90
67	3.5	96	400	20,000	28,000	36,000
83	4	96	500	25,000	35,000	45,000
116	5.8	96	700	35,000	49,000	63,000
167	8.3	110	1,000	50,000	70,000	90,000
250	12.5	150	1,500	75,000	105,000	135,000
333	16.5	195	2,000	100,000	140,000	180,000
416	15.5	248	2,500	125,000	175,000	225,000
500	18.6	300	3,000	150,000	210,000	270,000
584	21.6	348	3,500	175,000	245,000	315,000
666	24.5	398	4,000	200,000	280,000	360,000
750	27.5	445	4,500	225,000	315,000	405,000
834	26	485	5,000	250,000	350,000	450,000
916	28.5	530	5,500	275,000	385,000	495,000
1,000	31	575	6,000	300,000	420,000	540,000
1,083	33.5	620	6,500	325,000	455,000	585,000
1,167	36	665	7,000	350,000	490,000	630,000
1,250	38.5	715	7,500	375,000	525,000	675,000
1,333	41	760	8,000	400,000	560,000	720,000
1,416	43.5	810	8,500	425,000	595,000	765,000
1,500	45.5	860	9,000	450,000	630,000	810,000
1,583	48	910	9,500	475,000	665,000	855,000
1,666	50	955	10,000	500,000	700,000	900,000

This table is intended to show the existing relations between the different parts of a plant for warming. It will be understood that the figures in the above are not intended to indicate a fixed and unvarying relation existing between any two parts, but are meant to approximate such proportions as will occur in an average job working under average conditions.

WROUGHT IRON WELDED PIPE

DIMENSIONS, WEIGHTS, ETC., OF STANDARD SIZES FOR STEAM, GAS, WATER, OIL, ETC.

Inside Diameter Inches	Outside Diameter Inches	External Circumference Inches	Length of Pipe per Sq. Ft. of Outside Surface Feet	Internal Area Inches	External Area Inches	Length of Pipe Containing One Cubic Foot Feet	Weight per Foot of Length Lbs.	No. of Threads per Inch of Screw Lbs.	Contents in ^a Gallons per Foot Lbs.	Weights of Water per Foot of Length Lbs.
1/4	.40	1.272	9.44	.012	.129	2500.	.24	27	.0006	.005
1/4	.54	1.696	7.075	.049	.229	1385.	.42	18	.0026	.021
1/4	.67	2.121	5.657	.110	.358	751.5	.56	14	.0057	.047
1/4	.84	2.652	4.502	.196	.554	472.4	.84	14	.0102	.085
1/4	1.05	3.299	3.637	.441	.866	270.	1.12	11 1/2	.0230	.190
1	1.31	4.134	2.903	.785	1.357	166.9	1.67	11 1/2	.0408	.349
1 1/4	1.66	5.215	2.301	1.227	2.164	96.25	2.25	11 1/2	.0638	.527
1 1/4	1.9	5.969	2.01	1.767	2.835	70.65	2.69	11 1/2	.0918	.760
1 1/2	2	7.461	1.611	3.141	4.430	42.36	3.66	11 1/2	.1632	1.356
2	2.37	9.032	1.328	4.908	6.491	30.11	5.77	8	.2550	2.116
2 1/2	2.87	10.996	1.091	7.068	9.621	19.49	7.54	8	.3673	3.049
3	3.5	12.566	.955	9.621	12.566	14.56	9.05	8	.4998	4.155
3 1/2	4	14.137	.849	12.566	15.904	11.31	10.72	8	.6528	5.405
4	4.5	15.708	.765	15.904	19.635	9.03	12.49	8	.8263	6.851
4 1/2	5	17.475	.629	19.635	24.299	7.20	14.56	8	1.020	8.500
5	5.56	17.475	.577	28.274	34.471	4.98	18.76	8	1.469	12.312
6	6.62	20.813	.505	38.484	45.663	3.72	23.41	8	1.999	16.662
7	7.62	23.954	.444	50.265	58.426	2.88	28.34	8	2.611	21.750
8	8.62	27.096	.394	63.617	73.715	2.26	34.67	8	3.300	27.500
9	9.68	30.433	.355	78.540	90.792	1.80	40.64	8	4.081	34.000
10	10.75	33.772								

*The Standard U. S. gallon of 231 cubic inches

TABLE OF EXPANSION OF WROUGHT IRON PIPE

Tempera-ture of the Air when the Pipe is fitted	Length of Pipe when fitted	LENGTH OF PIPE WHEN HEATED TO			
		215 Degrees	265 Degrees	297 Degrees	338 Degrees
Deg. Fahr.	Feet	Feet Inches	Feet Inches	Feet Inches	Feet Inches
0	100	100 1.72	100 2.12	100 2.31	100 2.70
32	100	100 1.47	100 1.78	100 2.12	100 2.45
64	100	100 1.21	100 1.61	100 1.87	100 2.19

REGISTERS

Size of Opening	Capacity in Sq. Inches	Size of Opening	Capacity in Sq. Inches	Size of Opening	Capacity in Sq. Inches
6 x 10	40	10 x 14	93	20 x 20	267
8 x 10	53	10 x 16	107	20 x 24	320
8 x 12	64	12 x 15	120	20 x 26	347
8 x 15	80	12 x 19	152	21 x 29	406
9 x 12	72	14 x 22	205	27 x 27	486
9 x 14	84	15 x 25	250	27 x 38	684
10 x 12	80	16 x 24	256	30 x 30	600

ROUND REGISTERS

Size of Opening	Capacity in Sq. Inches	Size of Opening	Capacity in Sq. Inches	Size of Opening	Capacity in Sq. Inches
7 in.	26	12 in.	75	20 in.	209
8 "	33	14 "	103	24 "	301
9 "	42	16 "	134	30 "	471
10 "	52	18 "	169	36 "	679

IRON PIPE SIZES OF BRASS PIPE

Made to Correspond with Iron Tubes and Fit Iron Tube Fittings

LIST OF SIZES, LENGTHS, ETC.

OUTSIDE DIAMETER	SAME AS IRON SIZE	WEIGHT PER FOOT	
		Brass	Copper
13-32 In.	1-8 In.	.30 Pounds	.31 Pounds.
9-16 "	1-4 "	.43 "	.45 "
11-16 "	3-8 "	.58 "	.61 "
13-16 "	1-2 "	.80 "	.84 "
1 1-16 "	3-4 "	1.17 "	1.23 "
1 5-16 "	1 "	1.67 "	1.75 "
1 5-8 "	1 1-4 "	2.42 "	2.54 "
1 7-8 "	1 1-2 "	2.92 "	3.07 "
2 3-8 "	2 "	4.17 "	4.38 "
2 7-8 "	2 1-2 "	5. "	5.25 "
3 1-2 "	3 "	8. "	8.40 "
4 "	3 1-2 "	10. "	10.50 "
4 1-2 "	4 "	12. "	12.00 "

TABLE OF DECIMAL EQUIVALENTS

Of 8ths, 16ths, 32nds and 64ths of an Inch

8ths	32nds	64ths	64ths
$\frac{1}{8} = .125$	$\frac{1}{16} = .03125$	$\frac{1}{32} = .015625$	$\frac{1}{64} = .0078125$
$\frac{3}{8} = .375$	$\frac{3}{16} = .09375$	$\frac{3}{32} = .046875$	$\frac{3}{64} = .0234375$
$\frac{5}{8} = .625$	$\frac{5}{16} = .15625$	$\frac{5}{32} = .078125$	$\frac{5}{64} = .0390625$
$\frac{7}{8} = .875$	$\frac{7}{16} = .21875$	$\frac{7}{32} = .109375$	$\frac{7}{64} = .0546875$
$16ths$			
$\frac{1}{16} = .0625$	$\frac{1}{32} = .03125$	$\frac{1}{64} = .015625$	$\frac{1}{128} = .0078125$
$\frac{3}{16} = .1875$	$\frac{3}{32} = .09375$	$\frac{3}{64} = .046875$	$\frac{3}{128} = .0234375$
$\frac{5}{16} = .3125$	$\frac{5}{32} = .15625$	$\frac{5}{64} = .078125$	$\frac{5}{128} = .0390625$
$\frac{7}{16} = .4375$	$\frac{7}{32} = .21875$	$\frac{7}{64} = .109375$	$\frac{7}{128} = .0546875$
$\frac{9}{16} = .5625$	$\frac{9}{32} = .28125$	$\frac{9}{64} = .140625$	$\frac{9}{128} = .07234375$
$\frac{11}{16} = .6875$	$\frac{11}{32} = .34375$	$\frac{11}{64} = .171875$	$\frac{11}{128} = .08671875$
$\frac{13}{16} = .8125$	$\frac{13}{32} = .40625$	$\frac{13}{64} = .203125$	$\frac{13}{128} = .103125$
$\frac{15}{16} = .9375$	$\frac{15}{32} = .46875$	$\frac{15}{64} = .234375$	$\frac{15}{128} = .121875$

THE MOVEMENT OF WARM AIR IN FLUES

The power that causes the upward motion of heated air in flues, is relatively small, being merely the difference in weight between equal columns of air at different temperatures. The colder air forces the warmer column upward with a force proportionate to this difference in weight, and with a velocity equal to that acquired by a body falling through a space equal to the difference in height that would be occupied by two columns of equal weight but of different temperatures.

According to the known law of gravitation, the velocity will be approximately equal to eight (8) times the square root of the height of descent in decimals of a foot. The discharge of air under the above conditions, however, is subject to certain corrections for friction, etc., and in general practice a deduction of one fourth ($\frac{1}{4}$) is made to represent the true rate of discharge.

Opposite are two tables, the first showing the discharge of air from a flue one foot cross section and one foot high, for given differences in temperature, with corrections for friction. The second table shows the square root of different heights of flues, and is a multiplier for the first table. Combining the two tables to meet existing conditions the total discharge of air from any flue may be estimated.

For example: what is the discharge of air from a flue 15 feet high, with an area of 2 square feet, when the inside temperature is 72° and the outside temperature is 42° Fahrenheit? The difference of temperature between the air in the flue and that outside is 30°, and by reference to table No. 1, we find that the discharge of air from a flue 1 foot high, and 1 square foot cross section, for this difference in temperature is 88 cubic feet per minute. Multiplying this by 2 feet, the area of the flue in question, and by the square root of 15 (table No. 2) for the height, we get 681.12, which is the discharge per minute in cubic feet, under the above conditions.

*TABLE No. 1

The discharge of air per minute from a flue one square foot in section and one foot high at different temperatures

Excess of Temperature of Air in Flue over Outside Air

	5°	10°	15°	20°	25°	30°	35°	40°	45°	50°	55°	60°	65°	70°	75°
Temperature of Outside Air	38	53	65	76	84	92	100	106	113	119	125	130	136	141	145
	37	53	63	75	83	91	98	105	111	118	124	128	134	139	144
	37	52	62	74	82	90	97	104	110	117	122	127	132	137	142
	36	51	62	73	81	89	96	103	109	115	120	126	131	136	141
	36	51	62	72	80	88	95	102	108	114	119	125	130	135	140
	36	50	62	71	80	87	94	101	107	113	118	124	129	134	139
	35	50	61	71	79	86	93	100	106	112	117	123	127	133	137
	35	49	61	70	78	85	92	99	105	111	116	121	126	131	136
	35	49	60	69	77	85	91	98	104	110	115	120	125	130	134
	34	48	60	69	77	84	90	97	103	109	114	119	124	128	133
	34	48	59	68	76	83	90	96	102	108	113	118	123	127	131

*TABLE No. 2

Square Roots of Heights of Flues. Multipliers for above Table

	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H
Column H = Height of Flue in Feet	1	1	10	3.16	19	4.36	28	5.29	37	6.08	46	6.78	55	7.42	64
	2	1.41	11	3.32	20	4.47	29	5.39	38	6.16	47	6.86	56	7.48	65
	3	1.73	12	3.40	21	4.58	30	5.48	39	6.24	48	6.93	57	7.55	66
	4	2	13	3.61	22	4.69	31	5.57	40	6.32	49	7	58	7.62	67
	5	2.24	14	3.74	23	4.80	32	5.66	41	6.4	50	7.07	59	7.68	68
	6	2.45	15	3.87	24	4.90	33	5.74	42	6.48	51	7.14	60	7.75	69
	7	2.65	16	4	25	5	34	5.83	43	6.56	52	7.21	61	7.81	70
	8	2.83	17	4.12	26	5.10	35	5.92	44	6.63	53	7.29	62	7.87	71
	9	3	18	4.24	27	5.2	36	6	45	6.71	54	7.35	63	7.94	72

*Heat for the Warming and Ventilation of Buildings by J. H. Mills

TEMPERATURE AND VOLUME OF STEAM at Different Pressures

PRESSURE IN POUNDS		Temperature in Fahrenheit Degrees	VOLUME	
By Steam Gauge	Above Vacuum		Compared with Water	Cubic Feet of Steam from 1 lb. of Water
0	15	212.0	1642	26.36
5	20	228.0	1299	19.72
10	25	240.1	996	15.99
15	30	250.4	838	13.46
20	35	259.3	726	11.65
25	40	267.3	640	10.27
30	45	274.4	572	9.18
35	50	281.0	518	8.31
40	55	287.1	474	7.61
45	60	292.7	437	7.01
50	65	298.0	405	6.49
55	70	302.9	378	6.07
60	75	307.5	353	5.68
65	80	312.0	333	5.35
70	85	316.1	314	5.05
75	90	320.2	298	4.79
80	95	324.1	283	4.55
85	100	327.9	270	4.33
90	105	331.3	257	4.14
95	110	334.6	247	3.97
100	115	338.0	237	3.80
105	125	344.2	219	3.51
110	135	350.1	203	3.27
115	145	355.6	190	3.06
120	155	361.0	179	2.87
125	165	366.0	169	2.71

Table of Temperature, Specific Gravity and Weight of Water;
also Pressure due to Different Heights in Feet

Temperature	Specific Gravity	Height in Feet	Pounds Pressure	Temperature	Specific Gravity	Height in Feet	Pounds Pressure
20	0.9780	1	4.3	132	0.9850	90	39.00
30	0.9742	2	8.6	142	0.9822	100	43.31
40	0.9703	5	21.6	152	0.9792	110	47.63
42	0.9697	10	43.3	162	0.9761	120	51.97
52	0.9755	15	64.9	172	0.9729	130	56.29
62	0.9786	20	86.6	182	0.9694	140	60.63
72	0.9744	25	108.2	192	0.9659	150	64.90
82	0.9719	40	173.2	202	0.9622	160	69.11
62	0.9741	50	21.65	212	0.9585	170	73.46
102	0.9621	60	258.0	230	0.9513	180	77.95
112	0.9583	70	303.1	250	0.9430	190	82.81
122	0.9575	80	346.5	275	0.9321	200	96.62

HEAT UNITS IN WATER

Between 32° and 212° Fahrenheit, and Weight of Water per Cubic Foot

Temperature Degrees F.	Heat Units	Weight in Pounds per Cubic Foot	Temperature Degrees F.	Heat Units	Weight in Pounds per Cubic Foot	Temperature Degrees F.	Heat Units	Weight in Pounds per Cubic Foot
32	0.	62.42	123	91.16	61.68	168	136.44	60.81
35	3.	62.42	124	92.17	61.67	169	137.45	60.79
40	8.	62.42	125	93.17	61.65	170	138.45	60.77
45	13.	62.42	126	94.17	61.63	171	139.46	60.75
50	18.	62.41	127	95.18	61.61	172	140.47	60.73
52	20.	62.40	128	96.18	61.60	173	141.48	60.70
54	22.01	62.40	129	97.19	61.58	174	142.49	60.68
56	24.01	62.39	130	98.19	61.56	175	143.50	60.66
58	26.01	62.38	131	99.20	61.54	176	144.51	60.64
60	28.01	62.37	132	100.20	61.52	177	145.52	60.62
62	30.01	62.36	133	101.21	61.51	178	146.52	60.59
64	32.01	62.35	134	102.21	61.49	179	147.53	60.57
66	34.02	62.34	135	103.22	61.47	180	148.54	60.55
68	36.02	62.33	136	104.22	61.45	181	149.55	60.53
70	38.02	62.31	137	105.23	61.43	182	150.56	60.50
72	40.02	62.30	138	106.23	61.41	183	151.57	60.48
74	42.03	62.28	139	107.24	61.39	184	152.58	60.46
76	44.03	62.27	140	108.25	61.37	185	153.59	60.44
78	46.03	62.25	141	109.25	61.36	186	154.60	60.41
80	48.04	62.23	142	110.26	61.34	187	155.61	60.39
82	50.04	62.21	143	111.26	61.32	188	156.62	60.37
84	52.04	62.19	144	112.27	61.30	189	157.63	60.34
86	54.05	62.17	145	113.28	61.28	190	158.64	60.32
88	56.05	62.15	146	114.28	61.26	191	159.65	60.29
90	58.06	62.13	147	115.29	61.24	192	160.67	60.27
92	60.06	62.11	148	116.29	61.22	193	161.68	60.25
94	62.06	62.09	149	117.30	61.20	194	162.69	60.22
96	64.07	62.07	150	118.31	61.18	195	163.70	60.20
98	66.07	62.05	151	119.31	61.16	196	164.71	60.17
100	68.08	62.02	152	120.32	61.14	197	165.72	60.15
102	70.09	62.00	153	121.33	61.12	198	166.73	60.12
104	72.09	61.97	154	122.33	61.10	199	167.74	60.10
106	74.10	61.95	155	123.34	61.08	200	168.75	60.07
108	76.10	61.92	156	124.35	61.06	201	169.77	60.05
110	78.11	61.89	157	125.35	61.04	202	170.78	60.02
112	80.12	61.86	158	126.36	61.02	203	171.79	60.00
114	82.13	61.83	159	127.37	61.00	204	172.80	59.97
115	83.13	61.82	160	128.37	60.98	205	173.81	59.95
116	84.13	61.80	161	129.38	60.96	206	174.83	59.92
117	85.14	61.78	162	130.39	60.94	207	175.84	59.89
118	86.14	61.77	163	131.40	60.92	208	176.85	59.87
119	87.15	61.75	164	132.41	60.90	209	177.86	59.84
120	88.15	61.74	165	133.41	60.87	210	178.87	59.82
121	89.15	61.72	166	134.42	60.85	211	179.89	59.79
122	90.16	61.70	167	135.43	60.83	212	180.90	59.76

VOLUME AND WEIGHT OF AIR

and Weight of Vapor in Saturated Air

Tem- pera- ture	Volume	Number of Cubic Feet to 1 Pound	Weight of 1000 Cubic Feet Dry Air	Tension of Vapor	Weight of Vapor Saturated in 1000 Cubic Feet	Weight of Air Displaced by Vapor
0	0.9340	11.460	87.260	0.04379	0.07930	0.1264
5	0.9449	11.591	86.289	0.05747	0.10289	0.1646
10	0.9551	11.726	85.251	0.07116	0.12588	0.2014
15	0.9653	11.869	84.317	0.08535	0.14932	0.2389
20	0.9755	11.992	83.403	0.10748	0.18180	0.2909
25	0.9857	12.125	82.440	0.13367	0.22871	0.3661
30	0.9959	12.258	81.566	0.16581	0.27491	0.4398
32	1.0000	12.311	81.235	0.17989	0.29633	0.4741
36	1.0082	12.417	80.515	0.21066	0.35201	0.5632
40	1.0163	12.523	79.872	0.24604	0.40770	0.6523
44	1.0244	12.629	79.176	0.28647	0.47070	0.7531
48	1.0326	12.735	78.493	0.33284	0.54204	0.8672
52	1.0408	12.841	77.825	0.38574	0.62282	0.9965
56	1.0489	12.947	77.220	0.44352	0.71063	1.1370
60	1.0571	13.053	76.628	0.51683	0.82173	1.3147
64	1.0652	13.159	75.988	0.59229	0.93390	1.4943
68	1.0734	13.265	75.357	0.67994	1.0631	1.7008
72	1.0816	13.371	74.794	0.78018	1.21050	1.9368
76	1.0897	13.477	74.184	0.89103	1.31715	2.1076
80	1.0979	13.583	73.638	1.01669	1.5540	2.4864
84	1.1060	13.689	73.046	1.15705	1.7536	2.8058
88	1.1142	13.795	72.464	1.31554	1.9772	3.1635
92	1.1223	13.901	71.942	1.49067	2.2257	3.5611
96	1.1305	14.007	71.377	1.69214	2.5060	4.0096
100	1.1387	14.113	70.872	1.91937	2.8220	4.5152
104	1.1468	14.219	70.323	2.14669	3.133	5.0138
108	1.1550	14.325	69.784	2.43323	3.523	5.6368
112	1.1631	14.431	69.300	2.72984	3.926	6.2826
116	1.1713	14.537	68.776	3.05954	4.367	6.9882
120	1.1794	14.643	68.306	3.41728	4.843	7.7488
124	1.1876	14.749	67.797	3.81775	5.371	8.5940
128	1.1957	14.855	67.295	4.26073	6.088	9.7430
132	1.2039	14.961	66.845	4.72888	6.559	10.4950
136	1.2121	15.067	66.357	5.25807	7.240	11.584
140	1.2202	15.173	65.919	5.81736	7.957	12.731
144	1.2284	15.279	65.442	6.48029	8.800	14.048
148	1.2365	15.385	64.977	7.14323	9.630	15.408
152	1.2447	15.491	64.568	7.9104	10.595	16.952
156	1.2528	15.597	64.102	8.6923	11.566	18.506
160	1.2610	15.703	63.694	9.5948	12.681	20.290
164	1.2691	15.809	63.251	10.5579	13.828	22.125
168	1.2773	15.915	62.814	11.4673	14.950	23.920
172	1.2855	16.021	62.422	12.7165	16.47	26.36
176	1.2936	16.127	61.996	13.8657	17.43	27.89
180	1.3018	16.233	61.614	15.2343	19.47	31.96
184	1.3099	16.339	61.200	16.6030	21.08	33.73
188	1.3181	16.445	60.790	18.1447	22.89	36.63
192	1.3262	16.551	60.423	19.7441	24.75	39.60
196	1.3344	16.657	60.024	21.4297	26.69	42.71
200	1.3426	16.763	59.666	23.2962	28.85	46.16

GALVANIZED SHEET IRON

SIZES AND WEIGHTS

Gauge	Size	Ounces per Sq. Foot	Weight of Sheet in Lbs.	Gauge	Size	Ounces per Sq. Foot	Weight of Sheet in Lbs.
14	24x84	52 $\frac{1}{2}$	46	23	36x84	20 $\frac{1}{2}$	27
"	26x84	"	49 $\frac{1}{2}$	"	40x84	"	20
"	28x84	"	53 $\frac{1}{2}$	"	24x96	"	20 $\frac{1}{2}$
"	30x84	"	57 $\frac{1}{2}$	"	26x96	"	22 $\frac{1}{2}$
16	24x84	42 $\frac{1}{2}$	37	"	28x96	"	24
"	26x84	"	40 $\frac{1}{2}$	"	30x96	"	25 $\frac{1}{2}$
"	28x84	"	43 $\frac{1}{2}$	"	32x96	"	27 $\frac{1}{2}$
"	30x84	"	46 $\frac{1}{2}$	"	36x96	"	31
"	24x96	"	42 $\frac{1}{2}$	"	40x96	"	34 $\frac{1}{2}$
"	26x96	"	46	"	44x96	"	37
"	28x96	"	49 $\frac{1}{2}$	24	24x84	18 $\frac{1}{2}$	16 $\frac{1}{2}$
"	30x96	"	53	"	26x84	"	17
18	24x84	34 $\frac{1}{2}$	30 $\frac{1}{2}$	"	28x84	"	19
"	26x84	"	32	"	30x84	"	20 $\frac{1}{2}$
"	28x84	"	35 $\frac{1}{2}$	"	32x84	"	22
"	30x84	"	37 $\frac{1}{2}$	"	36x84	"	24
"	36x84	"	45 $\frac{1}{2}$	"	40x84	"	27
"	24x96	"	34 $\frac{1}{2}$	"	24x96	"	18 $\frac{1}{2}$
"	26x96	"	36 $\frac{1}{2}$	"	26x96	"	20
"	28x96	"	40 $\frac{1}{2}$	"	28x96	"	21 $\frac{1}{2}$
"	30x96	"	42 $\frac{1}{2}$	"	30x96	"	23
"	36x96	"	51 $\frac{1}{2}$	"	32x96	"	27 $\frac{1}{2}$
19	28x84	30 $\frac{1}{2}$	31	"	36x96	"	31
20	24x84	26 $\frac{1}{2}$	23	"	40x96	"	34
"	26x84	"	25	"	44x96	"	34
"	28x84	"	27	26	24x84	14 $\frac{1}{2}$	12
"	30x84	"	29	"	26x84	"	13
"	36x84	"	34 $\frac{1}{2}$	"	28x84	"	14
"	24x96	"	26	"	30x84	"	16
"	26x96	"	28 $\frac{1}{2}$	"	32x84	"	17
"	28x96	"	31	"	36x84	"	19
"	30x96	"	33	"	24x96	"	14 $\frac{1}{2}$
"	36x96	"	42	"	26x96	"	15 $\frac{1}{2}$
22	24x84	22 $\frac{1}{2}$	19 $\frac{1}{2}$	"	28x96	"	17
"	26x84	"	21 $\frac{1}{2}$	"	30x96	"	18 $\frac{1}{2}$
"	28x84	"	23	"	32x96	"	19 $\frac{1}{2}$
"	30x84	"	24 $\frac{1}{2}$	"	36x96	"	21
"	36x84	"	29 $\frac{1}{2}$	28	24x84	12 $\frac{1}{2}$	11
"	40x84	"	33	"	26x84	"	11
"	24x96	"	22	"	28x84	"	12
"	26x96	"	24 $\frac{1}{2}$	"	30x84	"	13
"	28x96	"	26 $\frac{1}{2}$	"	32x84	"	14
"	30x96	"	28	"	36x84	"	16
"	36x96	"	33 $\frac{1}{2}$	"	24x96	"	12
"	40x96	"	37 $\frac{1}{2}$	"	26x96	"	13
23	24x84	20 $\frac{1}{2}$	18	"	28x96	"	14 $\frac{1}{2}$
"	26x84	"	19 $\frac{1}{2}$	"	30x96	"	15 $\frac{1}{2}$
"	28x84	"	21	"	32x96	"	16 $\frac{1}{2}$
"	30x84	"	22 $\frac{1}{2}$	"	36x96	"	18 $\frac{1}{2}$
"	32x84	"	24				



MASSACHUSETTS DISTRICT POLICE

Boiler Inspection Department.

Office, State House.

Requirements of Boiler Inspection Department of District Police as to for Low Pressure Heating Boilers.

Upon all steam boilers used for heating purposes, having a grate area of over two square feet, and subject to inspection by this department, the following fittings must be provided, being necessary for safety.

One safety valve on each boiler, with no obstruction between valve and boiler. If pressure carried is to be below 25 pounds, the least area of the safety valve in inches is to be reckoned by dividing the area of grate in square feet by $\frac{3}{4}$ if a pop valve is used, or by 3 if a lever, weight, or simple spring valve is used.

One steam gauge on each boiler, connected with siphon or equivalent device between boiler and gauge, to fill gauge spring with water. The supply pipe is to come from steam space of boiler.

Each boiler must have at least two try cocks, the lower one to be placed $2\frac{1}{2}$ inches above the fusible plug or lowest safe water line. Where a glass is also used, the lower end of glass must be above the fusible plug or lowest safe water line.

Each boiler must be provided with stop valve on main steam pipe leading from the boiler. Each boiler must have check valve and stop valve on main return pipe.

Where a damper regulator is used, the pressure supply pipe must be taken from the steam space of the boiler.

Safety Valves for High Pressure.

If pressure carried is between 25 and 100 pounds, the area of safety valve in inches is to equal the area of grate in square feet divided by 3, for lever or dead weight valves, and by 4 for pop valves. If pressure is above 100 pounds, divide by 5 for pop valves and 4 for lever or dead weight valves.

Joseph E. Shaw
Chief Ass't. District Police

Perf No. 342.



Commonwealth of Massachusetts,

DISTRICT POLICE.

INSPECTION DEPARTMENT.

Mass.,

190

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In the ventilation of school buildings the many hundred examinations made by the inspectors of this department have shown that the following requirements can be easily complied with —

1. That the apparatus will, with proper management, heat all the rooms, including the corridors, to $70^{\circ} F.$ in any weather.
2. That, with the rooms at 70° and a difference of not less than 5° between the temperature of the outside air and that of the air entering the room at the warmest inlet, the apparatus will supply at least thirty cubic feet of air per minute for each scholar recommended in the room.
3. That such supply of air will so circulate in the rooms that no uncomfortable draught will be felt, and that the difference in temperature between any two points on the breathing plane in the occupied portion of a room will not exceed 5° .
4. That vitiated air in amount equal to the supply from the lungs will be removed through the ventilators.
5. That the sanitary appliances will be so ventilated that no odors therefrom will be perceived in any portion of the building.

To secure the approval of this department of plans showing methods or systems of heating and ventilation, the above requirements must be guaranteed in the specifications accompanying the plans.

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